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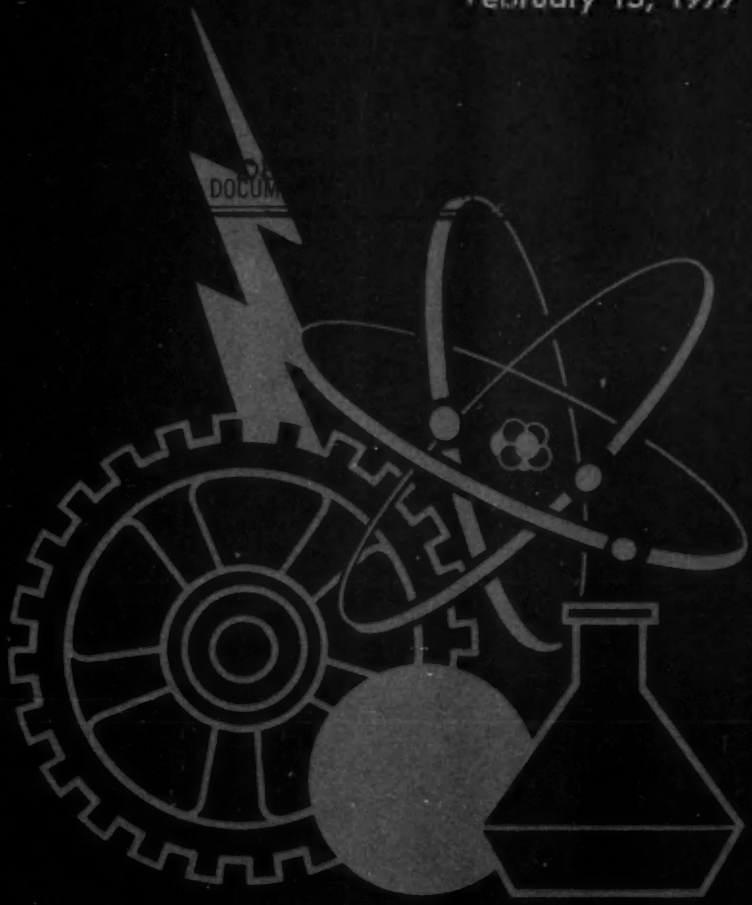
OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

February 15, 1977



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OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

February 15, 1977 Volume 955 Number 3

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PATENT AND TRADEMARK OFFICE NOTICES

Registration to Practice

The following are names of persons applying for registration to practice before the United States Patent and Trademark Office. Information tending to affect the eligibility of said applicants on moral, ethical, or other grounds, should be furnished the Commissioner of Patents and Trademarks on or before March 4, 1977.

LUTRELLE F. PARKER,
Chairman, Committee on Enrollment.

Alexander, Robert S., 821 Thackston, Spartanburg, S.C. 29302
Baicker, Sara J., 1924 N. Rhodes St., Arlington, Va. 22201
Choo, Tai-Sam, 307 Hunters Ridge, Midland, Mich. 48640
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D'Amico, Thomas J., 2231 Cartwright Pl., Reston, Va. 22091
Horwitz, Daniel D., 4808 Essex Ave., Chevy Chase, Md. 20015
Kaplan, George M., 725 Julia Ann St., #2, Cincinnati, Ohio 45220
Lawrence, Peter E., 7 Lavallee St., Hull, Quebec, Canada
Lupo, Raphael V., 7900 Carrleigh Pkwy., Springfield, Va. 22152
McGowan, Jack C., 8156 Sunburst Dr., Cincinnati, Ohio 45241
Roethel, John E., 2301 S. Jeff. Davis Hwy., Arlington, Va. 22202
Sauberer, Paul E., 527 Wilson Bridge Dr., #B-2, Oxon Hill, Md. 20021
Smith, Henry T., 225 E. 10th St., #2-E, New York, N.Y. 10003
Strawbridge, Douglas A., 3500 Humboldt Ave., S. Minneapolis, Minn. 55408
Turlock, Lance A., 2207 Riverside Dr., Ottawa, Ontario, Canada
Volpe, Anthony S., 6718 Torresdale Ave., Philadelphia, Pa. 19135
Wannisky, William M., 2911 Farm Rd., Alexandria, Va. 22302

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,993,479, J. Thurley, FLUID HEATERS; **3,265,113,** Thurley and Lowry, GAS BURNER APPARATUS, **filed** Nov. 22, 1974, D.C., W.D. Okla (Oklahoma City), Doc. 74–1004, *Black, Sivalls & Bryson, Inc.* v. *Keystone Steel Fabrication, Inc. et al.* Judgment stating that defendants have not and do not infringe upon plaintiff's patent by the use and manufacture and sale of their industrial heaters. Judgment is entered in favor of defendants. Plaintiff take nothing and injunctive relief is denied, Aug. 18, 1976.

3,956,303, A. F. Naylor, HYDRAULICALLY AND SPHERICALLY SUPPORTED INERTIAL REFERENCE, **filed** Sept. 27, 1976, United States Court of Claims (District of Columbia), Doc. 216–75, *TRW, Inc.* v. *The United States.* Judgment is entered for the plaintiff against the United States, Oct. 1, 1976.

3,158,317, I. H. Alexander, CONTROL DEVICE; **3,187,321,** S. L. Kaneny, OPERATOR-COMPUTER COMMUNICATION CONSOLE; **3,226,689,** Amdahl, Brian, Jr., Scarbrough, Koerner and Schneberger, MODULAR COMPUTER SYSTEM MASTER DISCONNECT CAPABILITY; **3,226,692,** Fuller, Koerner and Schneberger, MODULAR COMPUTER SYSTEM; **3,258,748,** Schneberger, Scarbrough, Bienhoff and Connolly, STORED LOGIC COMPUTER; **3,275,991,** E. J. Schneberger, MEMORY SYSTEM; **3,341,817,** J. C. Smeltzer, MEMORY TRANSFER APPARATUS, **filed** Mar. 1, 1974, D.C., N.D. Ill. (Chicago), Doc. 74c580, *Bunker Ramo Corporation* v. *International Business Machines Corporation.* Enter stipulation and order of dismissal under Rule 41(a)(2) F.R.C.P., Jan. 22, 1975.

3,187,321. (See 3,158,317.)

3,226,689. (See 3,158,317.)

3,226,692. (See 3,158,317.)

3,258,748. (See 3,158,317.)

3,265,113. (See 2,993,479.)

3,275,991. (See 3,158,317.)

3,295,662, T. D. Cronin, SURGICALLY IMPLANTABLE HUMAN BREAST PROSTHESIS, **filed** Feb. 27, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c746, *Dow Corning Corporation* v. *American Hospital Supply Corporation and Heyer-Schulte Corp.* Cause dismissed, Sept. 29, 1976.

3,341,817. (See 3,158,317.)

3,417,569, W. N. Laughlin, PROTECTIVE COATING AND METHOD, **filed** Aug. 3, 1970, D.C., E.D. La. (New Orleans), Doc. C.A. 70–2075, *W. N. Laughlin* v. *Royal Industries, Inc.* Final decree on consent stating that plaintiff is owner of said patent. Claim 7 is valid and infringed by defendant. Plaintiff's first and second cause of action is dismissed with Prejudice. Plaintiff's third and fourth cause of action is dismissed without prejudice, Apr. 13, 1971.

3,421,678, Thompson and Ihde, PROFILE COATED CARTON, **filed** July 28, 1976, D.C., N.D. Ga. (Atlanta), Doc.C76–1253–A, *Champion International Corporation* v. *International Paper Company.*

3,424,111, L. Maslow, READILY ASSEMBLABLE AND ADJUSTABLE SHELVING, **filed** Aug. 30, 1976, D.C., Pa. (Philadelphia), Doc. 76–2747, *Metropolitan Wire Corporation* v. *Falcon Products, Inc. et al.*

3,445,165, W. P. Dubbs, PHOTOGRAPHIC DISTORTION DEVICE, **filed** Oct. 5, 1976, D.C. Minn. (Minneapolis), Doc. 4–76–C–435, *Snook Corporation* v. *Combined Services, Inc.*

3,448,709, T. C. Hardwick, Jr., MARINE FLOAT CONSTRUCTION, **filed** Aug. 30, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV76–2791–LEW, *Thomas C. Hardwick* v. *E.S.A. Industries, Inc.*

3,452,188, Zidron, Rau and Nagel, PILOT CHART-BOARD AND EMERGENCY COCKPIT PANEL LIGHTING, **filed** Aug. 2, 1976, United States Court of Claims (District of Columbia), Doc. 317–76, *Telex Communications, Inc.* v. *The United States.*

3,482,864, J. M. Bynum, FLUID SEALED JOINT, **filed** Apr. 29, 1976, D.C., C.D. Calif. (Los Angeles), Doc. CV76–1382–RJK, *Hi-Shear Corporation* v. *Kaynar Mfg. Co., Inc.*

3,486,495, H. W. Allen, ARCHERY BOW WITH DRAW FORCE MULTIPLYING ATTACHMENTS, **filed** Sept. 10, 1974, D.C., E.D. Wash. (Spokane), Doc. C–74–210, *Allen Archery, Inc.* v. *Martin Archery, Inc. et al.* Judgment against defendant, Kam-Act Enterprises, Inc. Consent judgment and decree entered Sept. 28, 1976.

3,490,356, Peterson and Hogan, SPRAY DISCHARGE HEAD, **filed** July 9, 1974, D.C., N.D. Ill. (Chicago), Doc. 74c1916, *Reynolds Products, Inc.* v. *Cory Corporation.* Motion of plaintiff pursuant to Rule 41(a)(1)(i). Cause dismissed without prejudice, Sept. 13, 1974.

3,521,500, Duke and Rountree, PIPE SPINNER, **filed** Aug. 9, 1976, D.C., S.D. Tex. (Houston), Doc. 76–H–1325, *J. L. H. Rountree* v. *Varco International, Inc.*

3,526,219, L. Balamuth, METHOD AND APPARATUS FOR ULTRASONICALLY REMOVING TISSUE FROM A BIOLOGICAL ORGANISM; **3,589,363,** Banko and Kelman, MATERIAL REMOVAL APPARATUS AND METHOD EMPLOYING HIGH FREQUENCY VIBRATIONS; **3,902,495,** Weiss and Broadwin, FLOW CONTROL SYSTEM, **filed** Aug. 16, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c3044, *Cavitron Corporation* v. *Sparta Instrument Corporation.*

3,542,321, R. D. Kahabka, TIE, **filed** Dec. 14, 1973, D.C., N.D. Ill. (Chicago), Doc. 73c3161, *Panduit Corp.* v. *Minnesota Mining and Manufacturing Co.* On motion of plaintiff, cause hereby dismissed with prejudice, Apr. 3, 1976.

3,589,363. (See 3,526,219.)

3,594,751, Ogden and Henderson, DETECTION OF PRODUCTS OF COMBUSTION, **filed** Oct. 1, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c3670, *Pittway Corporation* v. *The BRK Shareholders' Committee.*

3,824,822, D. C. Hanna, MODULE CAR WASH; **3,939,516**, same, filed Sept. 15, 1976, D.C., C.D. Calif. (Los Angeles), Doc. 76-2940, *Daniel C. Hanna* v. *A & G Car Wash Equipment Co. Inc.*

3,711,262, Keck and Schultz, METHOD OF PRODUCING OPTICAL WAVEGUIDE FIBERS; **3,823,995**, L. L. Carpenter, METHOD OF FORMING LIGHT FOCUSING FIBER WAVEGUIDE; **3,884,550**, Maurer and Shultz, GERMANIA CONTAINING OPTICAL WAVEGUIDE, filed July 14, 1976, D.C., W.D. Va. (Roanoke), Doc. 76-0144, *Corning Glass Works* v. *International Telephone and Telegraph Corporation.*

3,769,674, Droughton and Rhodes, METHOD FOR PRODUCING HEAT PIPES; **3,880,230**, Pessolano and Rhodes, HEAT TRANSFER SYSTEM; **3,884,292**, same, AIR-O-SPACE HEATER MEANS FOR RECOVERING HEAT FROM A FLUID STEAM; **3,884,293**, same, COOLING MEANS, filed Sept. 24, 1976, D.C., N.D. Tex. (Dallas), Doc. CA3-76-1287, *Q-Dot Corporation* v. *Isothermics, Inc.*

3,823,995. (See 3,711,262.)

3,880,062, Culpepper, Jr. and Stuck, HOOD; **3,946,650**, C. Culpepper, Jr., VENTILATION APPARATUS AND METHOD, filed Oct. 1, 1976, D.C.N.C. (Charlotte), Doc. C-C-76-272, *Aero-Dyne Manufacturing, Inc.* v. *Marshall Air Systems, Inc.* and *Robert M. Stuck.*

3,880,230. (See 3,769,674.)

3,884,292. (See 3,769,674.)

3,884,293. (See 3,769,674.)

3,884,550. (See 3,771,262.)

3,897,930, J. E. Young, HOT TOP SUSPENSION SYSTEM FOR INGOT MOLD, filed May 26, 1976, D.C. Md. (Baltimore), Doc. W76-795, *Combustion Engineering, Inc.* v. *J. W. Marshall, Inc.*

3,902,495. (See 3,526,219.)

3,939,516. (See 3,624,852.)

3,946,650. (See 3,880,062.)

PATENT NOTICES

Certificates of Correction for the Week of Feb. 15, 1977

D. 239,850	3,967,729	3,984,605	3,992,522
3,677,508	3,969,162	3,984,672	3,992,575
3,712,949	3,969,285	3,985,342	3,992,576
3,752,880	3,969,411	3,985,429	3,992,713
3,755,440	3,969,527	3,985,572	3,992,818
3,779,856	3,970,191	3,985,579	3,993,056
3,786,248	3,970,465	3,985,604	3,993,149
3,791,930	3,970,686	3,986,375	3,993,246
3,792,040	3,971,773	3,986,431	3,993,317
3,796,929	3,971,935	3,986,767	3,993,475
3,801,071	3,972,300	3,986,889	3,993,497
3,826,068	3,972,313	3,986,896	3,993,519
3,838,548	3,973,368	3,986,914	3,993,520
3,853,625	3,973,491	3,987,014	3,993,537
3,862,270	3,973,971	3,987,022	3,993,607
3,882,148	3,974,228	3,987,175	3,993,685
3,884,440	3,975,451	3,987,583	3,993,774
3,888,888	3,975,747	3,987,618	3,993,818
3,898,042	3,976,071	3,987,702	3,993,902
3,899,248	3,977,497	3,987,825	3,993,930
3,912,774	3,978,130	3,988,162	3,994,090
3,915,155	3,978,176	3,988,221	3,994,256
3,921,921	3,979,025	3,988,501	3,994,268
3,927,219	3,979,177	3,988,557	3,994,270
3,926,994	3,979,851	3,988,893	3,994,348
3,928,623	3,979,855	3,989,262	3,994,368
3,932,537	3,979,921	3,989,794	3,994,380
3,936,666	3,980,099	3,990,076	3,994,434
9,937,723	3,980,315	3,990,126	3,994,671
3,940,362	3,980,412	3,990,137	3,995,367
3,943,178	3,980,542	3,990,155	3,995,565
3,945,835	3,980,708	3,990,894	3,995,572
3,949,105	3,980,737	3,990,903	3,995,629
3,949,463	3,980,771	3,990,966	3,995,638
3,950,297	3,980,820	3,991,028	3,995,710
3,950,968	3,981,334	3,991,125	3,995,736
3,951,767	3,981,416	3,991,522	3,995,837
3,952,745	3,981,493	3,991,627	3,995,897
3,957,758	3,983,164	3,991,797	3,995,912
3,959,248	3,983,233	3,991,844	3,996,117
3,960,320	3,983,894	3,992,067	3,996,510
3,960,721	3,983,916	3,992,090	3,996,617
3,962,223	3,983,925	3,992,210	3,996,686
3,963,415	3,984,421	3,992,226	3,996,760
3,963,654	3,984,592	3,992,366	
3,966,589	3,984,603	3,992,436	

Patents Available for Licensing or Sale

D. 242,263. ASHTRAY FOR STOPPING SMOKING. Jack Golden and Philip Jager. Correspondence to: Mr. Jack Golden, 5025 Broadway, New York., N.Y., 10034.

3,260,028. METHOD OF CONSTRUCTING A BUILDING. R. Lee Fraser, 3723 Northwood Drive, Memphis, Tenn., 38111.

3,602,913. FACIAL PROTECTION FOR HAIR SPRAY. Doris F. Neese, Box 463, Eddy, Tex., 76524.

3,626,460. PHOTOGRAPHIC LETTER STYLE AND JOB LAYOUT MACHINE. Ralph H. Miller, 13619 Sunset, Detroit, Mich., 48212.

3,634,112. ALUMINUM POLYOXYCHLORIDE BONDED CASTABLE REFRACTORIES. Paul J. Yavorsky et al. Correspondence to: Mr. John D. Kern, Assistant Vice President, Technology, Basic Incorporated, 845 Hanna Building, Cleveland, Ohio, 44115.

3,825,262. HAND-HELD AMUSEMENT DEVICE WITH TETHERED BALL AND PLURAL TARGETS. Alicja Grzybowski, 3650 -G Colegrove, San Mateo, Calif., 94403.

3,838,841. FOLDING SHELF AND SHELF BRACKET. Phillip B. Cadman, 9206 Chestwall St., Orangevale, Calif., 95662.

3,862,699. CAP SECURING MEANS FOR A CONTAINER. William W. Wetzett, 803 Saxony Encinitos, Calif., 92024.

3,872,610. MATHEMATICS TEACHING APPARATUS. Matt J. Dumovich, 2151 Illion St., San Diego, Calif., 92110.

3,885,266. SANITARY SCOOP FOR REMOVAL OF DOG LITTER. Betty O. Nafziger, 157 Congress Run Rd., Cincinnati, Ohio, 45215.

3,885,689. BOAT LOADING AND UNLOADING APPARATUS. Hitam D. Grove, North Main St., New Athens, Ohio, 43981.

3,887,154. SUPPORT. John W. Corkett, 195 Minick St., Franklin, Ohio, 45005.

3,887,286. FINGERTIP PEN. Jackson P. Bucey, 41 Schofield Road, Rochester, N.Y., 14617.

3,888,336. SIDEWALK PLUG IN POLE FOR CAR HEATERS OR THE LIKE. James Zajic, Box 176, Wainwright, Alberta, Canada, TOB 4 po.

3,889,979. AUTOMATIC HITCHING DEVICE. Gregory E. Schmiesing, R.R. #1, New Bremen, Ohio, 45869.

3,890,931. SANITARY PET BOX. H. G. Saver, 65 Prospect St., Stamford, Conn., 06901.

3,895,473. PROCESS FOR MANUFACTURE OF LOW COST HOUSING AT SITE. R. Lee Fraser, 3723 Northwood Drive, Memphis, Tenn., 38111.

3,899,157. TACK FASTENER AND STRIPPER. Robert Thomas, 30 West Chicago Ave., Chicago, Ill., 60610.

3,902,690. DERAILING DEVICE WITH SAFETY LOCK. Rayno H. Wanha, 8269 Vaughan, Detroit, Mich., 48228.

3,907,203. SHOWER EQUIPMENT WITH LIQUID DISPENSOR FOR SHOWER HEAD. Thomas L. Skillings, 511 Latourette St., Oregon City, Oreg., 97045.

3,907,218. HEAVIER THAN AIR FREIGHT AIRCRAFT. Ralph H. Miller, 13619 Sunset, Detroit, Mich., 48212.

3,912,902. ELECTRICALLY HEATED TOURING SKI-BASE WAX APPLICATOR DEVICE. Myron M. Herniter, 20 Regina Place, Yonkers, N.Y., 10703.

3,913,440. GUIDE DEVICE FOR POWER SAW AND THE LIKE. Richard D. Baker, 3376, McLaughlin Ave., Los Angeles, Calif., 90066.

3,913,871. HEAVIER THAN AIR PASSENGER AIRCRAFT. Ralph H. Miller, 13619 Sunset, Detroit, Mich., 48212.

3,913,920. NAVAL WARFARE BOARD GAME APPARTUS. Lonnie B. Brumitt, 1013 Rollins Cr., Hampton, Va., 23663.

3,918,385. MOORING DEVICE. George Wallace, 4305 West 13 Mile Road, Royal Oak, Mich., 48072.

3,918,827. FUEL LESS WATER PRESSURE MACHINE. John L. Conn, P.O. Box 4501, Spartanburg, S.C., 29303.

3,949,730. FISHING REEL SUPPORTING BRACKET FOR ARCHERY BOWS. Simon R. Schoenberger, 1806 Bridge City Ave., Bridge City, La., 70094.

3,952,422. PERSISTENCE TEST APPARATUS. David B. Roberts, Jr., 211 4th Place SW., Largo, Fla., 33540.

3,952,821. MOTOR DRIVEN GOLF BAY CART. Charles G. Craveu, 35 Will Drive, Canton, Mass., 02021.

3,953,983. REFRIGERATION METHOD AND REFRIGERATION APPARATUS FOR CARRYING OUT THE METHOD. Ernst Sander, Correspondence to: Craig Antonelli, 909 Watergate Office Bldg., 2600 Virginia Ave., NW., Washington, D.C., 20037.

3,964,105. KNOT SIMULATOR NECKTIE KNOT. Thomas R. Gideon, P.O. Box 399, Aztec, N. Mex., 87410.

3,965,663. SPUN YARN. Kammgarnspinnerei Burglen, Burglen, Switzerland. Correspondence to: Striker, Striker, & Stenby, 360 Lexington Ave., New York, N.Y., 10017.

3,966,408. STERILANT IMMERSION CONTAINER WITH COVER ACTUATED TRAY. Dr. Richard E. Drennen, Fairway Heights, Denision, Iowa., 51442.

3,974,604. EASY ANCHOR. John L. Conn, P.O. Box 4501, Spartanburg, S.C., 29303.

3,982,711. SOD LAYING MACHINE. Frank Bradley, Box 255, 71 Highway, Diamond, Mo., 64840.

3,983,928. DUAL TEMPERATURE THERMOSTATIC CONTROLLER. Robert W. Barnes, 108 Deep Dale Drive East, Levittown, Pa., 19056.

3,985,148. CRUTCH CARRY-ALL ATTACHMENT. Phillip B. Cadman, 9206 Chestwall St., Orangevalle, Calif., 95662.

3,986,723. THE REMOVABLE BOAT WHEEL SYSTEM FOR CAR TOP BOATS. Wayne W. Brockelsby, 1625 Margate Ave., Orlando, Fla., 32803.

Dravo Corporation is prepared to grant non-exclusive licenses under the following patents upon reasonable terms.

Applications for license may be addressed to: Patent Counsel, Dravo Corporation, One Oliver Plaza, Pittsburgh, Pa., 15222.

3,914,378. PROCESS FOR WET SCRUBBING OF SULFUR DIOXIDE FROM FLUE GAS.

3,919,393. PROCESS FOR SULFUR DIOXIDE REMOVAL FROM COMBUSTION GASES.

3,919,394. PROCESS FOR THE REMOVAL OF OXIDES OF SULFUR FROM A GASEOUS STREAM.

3,920,795. STABILIZATION OF SLUDGE SLURRIES.

AMSTED Industries Incorporated is prepared to sell or grant licenses under the following U.S. Patents.

Inquiries for license under or sale of these patents may be addressed to Chief Patent Attorney, AMSTED Industries Incorporated, 3700 Prudential Plaza, Chicago, Ill., 60601.

3,397,291. RETAINING RIB AND PIN FOR THIRD RAIL CONTACT SHOE.

3,679,028. MULTIPLE UNIT BRAKE.

3,253,680. WHEEL TREAD BRAKE ARRANGEMENT.

3,384,207. RAILWAY BRAKE SAFETY DEVICE.

3,396,823. VARIABLE LOAD BRAKE.

3,404,754. RAILWAY WHEEL TREAD BRAKE.

3,621,941. BRAKE MECHANISM.

3,721,323. CLAMPING DEVICE.

3,448,837. RAILWAY BRAKE SAFETY DEVICE.

3,412,830. AUTOMATIC BRAKE SLACK ADJUSTER.

3,432,011. AUTOMATIC SLACK ADJUSTER.

3,516,696. SLACK ADJUSTER.

Re 27,043. SHEARING MACHINE AND METHOD.

3,500,513. ISODYNAMIC APPARATUS FOR MOLDING CERAMIC PIPE.

3,548,466. MAKING PIPE.

3,659,992. EXTRUDING FITTINGS.

3,783,042. METHOD OF COOLING A SPHERICAL OBJECT.

3,627,018. METHOD FOR PRODUCING CASTINGS IN A PERMANENT MOLD.

3,299,853. APPARATUS FOR COATING ELONGATED OBJECTS.

3,318,584. CONCRETE MIXER AND CONVEYOR.

3,610,288. COMBINED PIPE CONNECTOR AND PIPE CAP.

General Electric Company is prepared to grant non-exclusive licenses under the following patents upon reasonable terms to domestic manufacturers.

Applications for license may be addressed to: Division Patent Counsel, Switchgear & Distribution Transformer Division, General Electric Company, 6901 Elmwood Ave., Philadelphia, Pa., 19142.

3,991,396. ELECTRIC CIRCUIT PROTECTOR COMPRISING PARALLEL - CONNECTED LIQUID-METAL CURRENT-LIMITING DEVICES.

Application for license may be addressed to Patent Counsel, Gas Turbine Products Division, General Electric Company, 1 River Road, Building No. 500 2nd Floor, Schenectady, N.Y., 12306.

3,993,912. MARINE PROPULSION SYSTEM.

Application for license may be addressed to Patent Counsel, Switchgear and Distribution Transformer Division, General Electric Company, 6901 Elmwood Ave., Philadelphia, Pa., 19142.

3,920,885. HIGH-VOLTAGE COMPRESSED-GAS INSULATED BUS.

3,959,712. PHASE CONVERTER.

3,970,809. ELECTRIC CIRCUIT BREAKER COMPRISING PARALLEL-CONNECTED VACUUM INTERRUPTERS.

3,970,810. ELECTRIC CIRCUIT COMPRISING PARALLEL-CONNECTED VACUUM INTERRUPTERS.

3,982,088. HIGH VOLTAGE ELECTRIC CIRCUIT BREAKER COMPRISING SERIES-CONNECTED VACUUM INTERRUPTER AND FLUID-BLAST INTERRUPTER.

Applications for licenses may be addressed to the Division Patent Counsel, Electronic Systems Division, General Electric Company, Building 3, Room 216, Electronics Park, Syracuse, N.Y., 13201.

3,786,509. AUTOMATIC CANCELLER.

3,793,443. METHOD OF PREPARING FERRITES.

3,803,624. MONOPULSE RADAR ANTENNA ARRAY FEED NETWORK.

3,816,725. MULTIPLE LEVEL ASSOCIATIVE LOGIC CIRCUITS.

3,818,452. ELECTRICALLY PROGRAMMABLE LOGIC CIRCUITS.

3,819,954. SIGNAL LEVEL SHIFT COMPENSATION IN CHARGE-TRANSFER DELAY LINE CIRCUITS.

3,845,490. STRIPLINE SLOTTED BALUN DIPOLE ANTENNA.

3,849,638. SEGMENTED ASSOCIATIVE LOGIC CIRCUITS.

3,851,299. DATA PROCESSING SYSTEMS.

3,851,493. GAS SEPARATION AND PURIFICATION UTILIZING TIME SEQUENCED FLOW THROUGH A PAIR OF REGENERATORS.

3,859,519. WIDE DYNAMIC RANGE OMNIDIRECTIONAL OPTICAL SENSOR FOR DETECTING NUCLEAR DETONATIONS.

3,859,622. ELECTRONIC SCANNING SWITCH FOR SONAR.

3,863,199. BEAM FORMING OF MULTIPLE SIGNALS.

3,878,443. CAPACITOR WITH GLASS BONDED CERAMIC DIELECTRIC.

3,897,355. METHOD OF MAKING PERMANENT FERRITE MAGNETS.

3,905,036. FIELD EFFECT TRANSISTOR DEVICES AND METHODS OF MAKING SAME.

3,906,502. BILATERAL SERIES FEED FOR ARRAY ANTENNAS.

3,906,541. FIELD EFFECT TRANSISTOR DEVICES AND METHODS OF MAKING SAME.

Application for license may be addressed to the Group Patent Counsel, Major Appliance Business Group, General Electric Company, Appliance Park, Louisville, Ky., 40225.

3,111,830. AUTOMATIC CLOTHES WASHING MACHINE WITH LID SWITCH CONTROL.

3,815,113. FOOD TEMPERATURE MONITORING APPARATUS.

3,822,029. IMPACT PROTECTION FOR PLASTIC TUBS EMPLOYING MOLD RETENTION RIB.

3,826,898. BORDER TREATMENT OF COMPOSITE METAL PLATE SURFACE HEATING UNIT.

3,952,557. WOBBLE WASHING MACHINE.

3,958,433. WASH BASKET FOR A WASHING MACHINE.

3,961,152. MAGNETRON POWER SUPPLY AND CONTROL CIRCUIT.

3,963,370. LAUNDRY MACHINE BLOWER MECHANISM.

3,968,983. TWO POSITION, THREE FUNCTION LATCHING MECHANISM.

3,968,984. DOOR LATCH.

3,971,361. LOW THERMAL MASS COOKING UTENSIL.

3,975,720. FOOD THERMOMETER FOR MICROWAVE OVEN.

3,978,956. DELAYED-ACTION CENTRIFUGAL CLUTCH TRANSMISSION.

Applications for license under the following patents may be addressed to the General Electric Company, 100 Woodlawn Ave., Pittsfield, Mass., 01201.

3,576,458. HEAVY DUTY OVERVOLTAGE POWER GAP.

3,611,007. CURRENT LIMITING SPARK GAP ASSEMBLY HAVING ELECTROMAGNETIC MEANS FOR RETARDING ARC MOVEMENT THEREIN.

3,611,045. LIGHTNING ARRESTER SPARKGAP ASSEMBLY HAVING OPPOSED ELECTROMAGNETIC FIELD-GENERATING MEANS FOR CONTROLLING ARC MOVEMENT.

3,638,302. METHOD OF MAKING ELECTROMAGNETIC CORES.

3,663,856. CURRENT LIMITING SPARKGAP WITH MEANS FOR REGULATING GAP VOLTAGE.

3,789,177. ACTUATING MECHANISM FOR A LIMIT SWITCH HAVING ELONGATED PIVOTALLY MOUNTED ACTUATING MEMBER.

3,812,554. CRIMP LOCKED OUTER TURN FOR INDUCTION CORE.

3,958,201. INTERLACED DISC COIL WINDING HAVING OFFSET CROSS-CONNECTIONS.

The RCA Corporation offers to grant non-exclusive licenses on reasonable terms and conditions under the patents listed below. Inquiries respecting licenses under RCA patents should be addressed to RCA Corporation, Staff Vice President, Domestic Licensing, 30 Rockefeller Plaza, New York, N.Y., 10036.

3,989,233. CATHODE RAY TUBE ASSEMBLY FIXTURE.

3,989,348. OPTICAL SCANNER WITH LARGE DEPTH OF FOCUS.

3,989,436. APPARATUS FOR PRODUCING INJECTION MOLDED AND CENTRALLY APERTURED DISC RECORDS.

3,989,997. ABSOLUTE-VALUE CIRCUIT.

3,990,000. ALTERNATING CURRENT CONTROL SYSTEM.

3,990,017. CURRENT AMPLIFIER.

3,990,095. SELENIUM RECTIFIER HAVING HEXAGONAL POLYCRYSTALLINE SELENIUM LAYER.

3,990,099. PLANAR TRAPATT DIODE.

3,990,101. SOLAR CELL DEVICE HAVING TWO HETEROJUNCTIONS.

3,990,692. ARTICLE POSITIONING APPARATUS.

3,990,773. BINARY-CODED FRAUNHOFER HOLOGRAM RECORDING TECHNIQUE.

3,991,227. METHOD FOR FORMING ELECTRODE PATTERNS IN TRANSPARENT CONDUCTIVE COATINGS ON GLASS SUBSTRATES.

3,991,228. DEPOSITION OF TIN OXIDE FILMS ON GLASS.

3,991,328. PLANAR TRANSFERRED ELECTRON LOGIC DEVICE.

3,991,339. LIGHT EMITTING DIODE WITH REFLECTOR.

3,991,380. COMPLEMENTARY FIELD EFFECT TRANSISTOR DIFFERENTIAL AMPLIFIER.

3,991,381. LINEAR HIGH POWER TRANSISTOR AMPLIFIER.

3,992,106. ERROR CANCELLING SCANNING OPTICAL ANGLE MEASUREMENT SYSTEM.

3,992,648. DRIVE PULSE GENERATOR FOR A TELEVISION DEFLECTION CIRCUIT.

3,992,676. CURRENT AMPLIFIERS.

3,992,770. AUTOMATIC ASSEMBLY OF SEMICONDUCTOR DEVICES.

3,993,316. OVERHEAD SIGNAL PICKUP DEVICE.

3,993,515. METHOD OF FORMING RAISED ELECTRICAL CONTACTS ON A SEMICONDUCTOR DEVICE.

3,993,863. DISC RECORD GROOVE SKIPPER.

3,993,868. MINIMUM SHIFT KEYING COMMUNICATION SYSTEM.

3,993,931. GATING CIRCUIT FOR THYRISTOR DEFLECTION SYSTEM.

3,993,951. ALTERNATING CURRENT METER CIRCUIT.

3,993,958. FAST ASQUISITION CIRCUIT FOR A PHASE LOCKED LOOP.

3,993,993. DIGITAL-TO-SYNCHRO CONVERTER.

3,993,995. RESPIRATION MONITOR.

3,994,160. ACCELERATION BURST TEST APPARATUS AND METHOD FOR INTERNAL COMBUSTION ENGINES.

3,995,107. CHARGE COUPLED PARALLEL-TO-SERIAL CONVERTER FOR SCENE SCANNING AND DISPLAY.

3,995,146. DETECTION SYSTEM FOR SPATIALLY-DISTRIBUTED SET OF RADIATION BEAMS MANIFESTING MULTIBIT BINARY CODE.

3,995,224. FAST AUTOMATIC GAIN CONTROL CIRCUIT WITH ADJUSTABLE RANGE.

3,995,235. PHASE CONTROL CIRCUIT INCLUDING AN OPERATIONAL TRANSCONDUCTANCE AMPLIFIER SUITABLE FOR USE IN AUDIO FREQUENCY SIGNAL PROCESSING APPARATUS.

3,984,261. OHMIC CONTACT.

3,984,279. LABELING APPARATUS.

3,984,587. CHEMICAL VAPOR DEPOSITION OF LUMINESCENT FILMS.

3,984,629. FLYING SPOT SCANNER UNAFFECTED BY AMBIENT LIGHT.

3,984,683. APPARATUS AND METHOD FOR ANALYZING BIOLOGICAL CELLS FOR MALIGNANCY.

3,984,705. HIGH POWER REMOTE CONTROL ULTRASONIC TRANSMITTER.

3,984,723. DISPLAY SYSTEM UTILIZING BEAM SHAPE CORRECTION.

3,984,729. DEFLECTION WAVEFORM CORRECTION SIGNAL GENERATOR.

3,984,771. ACCURATE DIGITAL PHASE/FREQUENCY EXTRACTOR.

3,984,787. TWO-INDUCTOR VARACTOR TUNABLE SOLID-STATE MICROWAVE OSCILLATOR.

3,984,828. CHARACTER GENERATOR FOR TELEVISION CHANNEL NUMBER DISPLAY WITH EDGING PROVISIONS.

3,984,835. HOMODYNE COMMUNICATION SYSTEM.

3,984,841. BROADBAND ANTENNA SYSTEM WITH THE FEED LINE CONDUCTORS SPACED ON ONE SIDE OF A SUPPORT BOOM.

3,984,861. TRANSCALLENT SEMICONDUCTOR DEVICE.

3,984,864. GATING CIRCUIT FOR A VIDEO DRIVER INCLUDING A CLAMPING CIRCUIT.

3,984,865. TRANSIENT SUPPRESSION IN TELEVISION VIDEO SYSTEMS.

3,984,907. ADHERENCE OF METAL FILMS TO POLYMERIC MATERIALS.

3,985,033. APPARATUS FOR ERECTING A TRUE VERTICAL AXIS.

3,985,919. VAPOR DEPOSITION OF CERMET LAYERS.

3,986,065. INSULATING NITRIDE COMPOUNDS AS ELECTRON EMITTERS.

3,986,132. SERIES ENERGIZED TRANSISTOR AMPLIFIER.

3,986,156. YOKE MOUNT ASSEMBLY.

3,986,176. CHARGE TRANSFER MEMORIES.

3,986,198. INTRODUCING SIGNAL AT LOW NOISE LEVEL TO CHARGE-COUPLED CIRCUIT.

3,986,604. OBJECT ORIENTATION APPARATUS.

3,986,872. METHOD OF INCREASING THE IMAGE EXPOSURE AND DEVELOPING SENSITIVITY OF MAGNETO-ELECTRIC PRINTING SYSTEM.

3,987,214. METHOD OF FORMING CONDUCTIVE COATINGS OF PREDETERMINED THICKNESS BY VACUUM DEPOSITING CONDUCTIVE COATING ON A MEASURING BODY.

3,987,285. DIGITAL MATCHED FILTERING USING A STEP TRANSFORM PROCESS.

3,987,327. LOW DARK CURRENT PHOTOCONDUCTIVE DEVICE.

3,987,368. EQUALIZATION OF BASE CURRENT FLOW IN TWO INTERCONNECTED TRANSISTOR AMPLIFIERS.

3,987,414. DIGITAL REMOTE CONTROL FOR ELECTRONIC SIGNAL RECEIVERS.

3,987,441. TRACKING GATE SERVOED BY RELATIVE RANGE.

3,988,167. SOLAR CELL DEVICE HAVING IMPROVED EFFICIENCY.

3,988,601. DATA PROCESSOR REORDER SHIFT REGISTER MEMORY.

3,988,653. REDUCTION OF HUNTING IN SYNCHRONOUS MOTOR.

3,988,738. DISPLAY DEVICE UTILIZING MAGNETIC STORAGE.

3,988,759. THERMALLY BALANCED PN JUNCTION.

3,988,765. MULTIPLE MESA SEMICONDUCTOR STRUCTURE.

3,978,579. AUTOMATIC ASSEMBLY OF SEMICONDUCTOR DEVICES.

3,978,719. TACHOMETER WITHOUT PHYSICAL CONNECTION TO INTERNAL COMBUSTION ENGINE.

3,979,157. ELECTRON TUBE BASE.

3,979,238. ETCHANT FOR SILICON NITRIDE AND BOROSILICATE GLASSES AND METHOD OF USING THE ETCHANT.

3,979,606. CURRENT LEVEL DETECTOR.

3,979,607. ELECTRICAL CIRCUIT.

3,979,611. TRANSISTOR SWITCHING CIRCUIT.

3,979,630. SHADOW MASK COLOR PICTURE TUBE HAVING NON-REFLECTIVE MATERIAL BETWEEN ELONGATED PHOSPHOR AREAS AND POSITIVE TOLERANCE.

3,979,672. TRANSISTOR TESTING CIRCUIT.

3,979,689. DIFFERENTIAL AMPLIFIER CIRCUIT.

3,979,735. INFORMATION STORAGE CIRCUIT.

3,980,507. METHOD OF MAKING A SEMICONDUCTOR DEVICE.

3,980,821. POWER SUPPLY FOR A TELEVISION RECEIVER.

3,980,854. GRAPHITE SUSCEPTOR STRUCTURE FOR INDUCTIVELY HEATING SEMICONDUCTOR WAFERS.

3,980,927. DEFLECTION CIRCUIT.

3,980,930. PROTECTION CIRCUIT.

3,980,956. COUNTER TYPE REMOTE CONTROL RECEIVER INCLUDING NOISE IMMUNITY SYSTEM.

3,980,959. TUNER BANDSWITCHING SYSTEM FOR A TELEVISION TUNING SYSTEM.

3,981,554. METHOD OF AIR LETTING AN EVACUATED CATHODE RAY TUBE.

3,981,559. LIQUID CRYSTAL DISPLAY.

3,981,560. ELECTROCHROMIC DISPLAY DEVICE.

3,981,729. PHOTOGRAPHIC METHOD EMPLOYING ORGANIC LIGHT-SCATTERING PARTICLES FOR PRODUCING A VIEWING-SCREEN STRUCTURE.

3,981,819. LUMINESCENT SULFIDES OF MONOVALENT AND TRIVALENT CATIONS

3,982,054. METHOD FOR ELECTROLESSLY DEPOSITING METALS USING IMPROVED SENSITIZER COMPOSITION.

3,982,066. METAL COATING FOR VIDEO DISCS.

3,982,108. HIGH-SPEED COUNTER WITH RELIABLE COUNT EXTRACTION SYSTEM.

3,982,160. SYSTEM FOR CONTROLLING TENSION OF MAGNETIC TAPE.

3,982,197. RADIATION RESPONSIVE VOLTAGE DIVIDING CIRCUIT.

3,982,215. METAL PLATED BODY COMPOSED OF GRAPHITE FIBRE EPOXY COMPOSITE.

3,982,271. HEAT SPREADER AND LOW PARASITIC TRANSISTOR MOUNTING.

3,982,273. SWITCHING ARRANGEMENT FOR FLESH TONE CORRECTION AND CHROMINANCE OVERLOAD CONTROL CIRCUITS.

3,982,908. NICKEL-GOLD-COBALT CONTACT FOR SILICON DEVICES.

3,983,316. TURNTABLE SPEED CONTROL SYSTEM.

3,983,318. VELOCITY CORRECTION SYSTEM WITH DAMPING MEANS.

3,983,443. VACUUM ELECTRON DEVICE HAVING DIRECTLY - HEATED MATRIX - CATHODE-HEATER ASSEMBLY.

3,983,452. HIGH EFFICIENCY DEFLECTION CIRCUIT.

3,983,502. BRIDGE-OUTPUT AMPLIFIER WITH DIRECT-COUPLED DIFFERENTIAL-MODE FEEDBACK.

3,983,571. ELECTRONIC IMAGE IDENTIFYING SYSTEM.

3,983,576. APPARATUS FOR ACCENTUATING AMPLITUDE TRANSISTIONS.

Patents Withdrawn From Register

General Electric Company hereby withdraws the following patents from the Register of Patents Available for Licensing. The patents were listed as being available in the OFFICIAL GAZETTE as indicated below.

3,500,118. ELECTRODELESS GASEOUS ELECTRIC DISCHARGE DEVICE UTILIZING FERRITE CORES. July 21, 1970.

3,521,120. HIGH FREQUENCY ELECTRODELESS FLUORESCENT LAMP ASSEMBLY. July 24, 1971 and Oct. 26, 1976.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF DECEMBER 18, 1976

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	2-2-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	4-22-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	11-11-75
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	2-11-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	1-8-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	8-12-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	2-19-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	12-17-75
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	6-21-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	1-22-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	6-10-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	2-26-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	5-5-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	3-1-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	1-12-76
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	5-20-76

Expiration of patents: The patents within the range of numbers indicated below expire during January 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,919,443 to 2,923,007 inclusive
Plant Patents..... Numbers 1,893 to 1,900, inclusive

REISSUES

FEBRUARY 15, 1977

Matter enclosed in heavy brackets appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,136
ENZYMATIC PROCESS USING IMMOBILIZED MICROBIAL CELLS

Chin K. Lee, and Margaret E. Long, both of Winston-Salem, N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Original No. 3,821,086, dated June 28, 1974, Ser. No. 161,337, July 9, 1971. Application for reissue Oct. 14, 1975, Ser. No. 621,707

Int. Cl.² C12B *1/00*; C12D *13/02*

U.S. Cl. 195—116 **13 Claims**

1. A process for effecting an enzyme-catalyzed transformation of a substrate in the presence of flocculated whole microbial cells having associated therewith active quantities of said enzyme which comprises contacting said substrate with an aggregate comprising said cells and a polyelectrolyte flocculating agent under conditions suitable for effecting said enzyme-catalyzed transformation, *said aggregate having been dried prior to use in said enzyme-catalyzed transformation*, and recovering transformed substrate.

Re. 29,137
PROCESS OF PRESERVING POTATOES IN CLOSED PACKAGES

Franz Mohwinkel, Ahlften uber Soltau, Germany, assignor to Washington Nu Process, Inc., Quincy, Wash.

Original No. 3,658,559, dated Apr. 25, 1972, Ser. No. 878,413, Nov. 20, 1969. Continuation-in-part of Ser. No. 804,694, March 5, 1969, abandoned. Application for reissue Feb. 14, 1974, Ser. No. 442,622

Claims priority, application Germany, June 28, 1969, 1932900; Mar. 9, 1968, 1692048; Aug. 21, 1968, 1792332

Int. Cl.² A23B *7/00*

U.S. Cl. 426—412 **6 Claims**

1. A process for cooking and preserving potatoes in a closed and sealed package of plastic material comprising: a vacuum-packing peeled, raw and sliced or diced potatoes in said package without adding any liquid so that there is no water or other liquid in the closed and sealed package other than the natural juices within the potatoes therein, cooking and then cooling said packaged potatoes at an external pressure exceeding the internal pressure in the package, and wherein during the vacuum-packing step each piece of potato in said package is brought into direct contact with the plastic material enveloping the pieces of potatoes to be cooked and preserved.

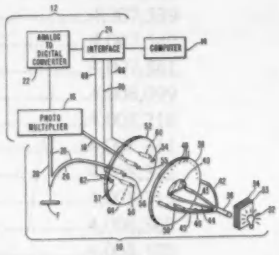
Re. 29,138
SYSTEM FOR PERFORMING SPECTRAL ANALYSES UNDER COMPUTER CONTROL

Frederick H. Dill, South Salem, and Karl L. Konnerth, Jr., Putnam Valley, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Original No. 3,751,643, dated Aug. 7, 1973, Ser. No. 256,030, May 23, 1972. Application for reissue July 31, 1975, Ser. No. 600,739

Int. Cl.² G01B *11/06*, *9/02*, *19/08*

U.S. Cl. 235—151.32 **26 Claims**



1. A method of operating a spectrophotometric system under the control of a digital computer to determine an attribute of a given material sample which is subject to spectral analysis, said method comprising the steps of:

a. conducting to said sample, during each of a series of nonadjacent time periods, a beam of variable wavelength monochromatic light furnished by a given source, the wavelength of said beam varying at a given rate through a specified range of wavelength values during each of said periods;

b. conducting to a light detector in said system the light which comes from said sample when it is impinged by said beam;

c. conducting directly to said light detector, during time periods intervening the periods specified in step a, the beam of monochromatic light furnished by said source, the wavelength of which varies at said given rate through said specified range during each of said intervening periods;

d. converting the output of said detector during each of the periods specified in steps a and c to a sequence of stored digital values representing the respective intensities of light detected at a series of regularly timed intervals throughout the respective one of said periods;

e. operating said computer to derive from the sequences of values stored during any pair of successive steps a and c a new sequence of numbers representing the calculated optical responses of said sample to incident light having the wavelength of said variable-wavelength beam at each of said timed intervals under a hypothetical condition where it is assumed that the incident light has uniform intensity for all wavelengths in said range and all system components have constant operating characteristics; and

f. operating said computer to determine from said derived sequence of numbers the attribute of said sample which is being measured.

REISSUES

FEBRUARY 15, 1977
PATENT EXAMINING CORPS

PATENTS

GRANTED FEBRUARY 15, 1977

ERRATA

For CLASS	See PATENT NO.
029–159 R	4,007,532
029–762	4,007,533
029–566.3	4,007,534
029–261	4,007,535
029–421 R	4,007,536
029–432.1	4,007,537
029–447	4,007,538
029–455	4,007,539
029–509	4,007,540
029–600	4,007,541
429–059	4,008,099
536–017	4,008,218
424–240	4,008,311
424–241	4,008,312
424–242	4,008,313
358–084	4,008,369
358–155	4,008,370
358–206	4,008,371
358–227	4,008,372

PATENTS

GRANTED FEBRUARY 15, 1977

ERRATA

CLASS	PATENT NO.
029-159 R	4,007,532
029-162	4,007,533
029-566.3	4,007,534
029-261	4,007,535
029-421 R	4,007,536
029-432.1	4,007,537
029-447	4,007,538
029-455	4,007,539
029-507	4,007,540
029-600	4,007,541
429-059	4,008,099
356-017	4,008,219
424-240	4,008,311
424-241	4,008,312
424-242	4,008,313
358-064	4,008,769
358-152	4,008,770
358-206	4,008,771
358-227	4,008,772

PATENTS

GRANTED FEBRUARY 15, 1977

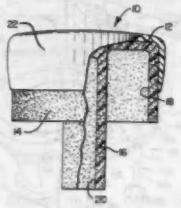
NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

GENERAL AND MECHANICAL

4,007,494
BONE CAP

Barry W. Sauer, Central, S.C., assignor to Glasrock Products, Inc., Atlanta, Ga.

Filed Apr. 11, 1975, Ser. No. 567,237
Int. Cl.² A61F *1/24*
U.S. Cl. 3—1.9 **4 Claims**

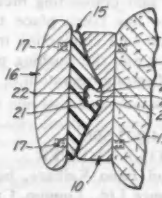


1. An improved cap for covering the stump of a partially amputated bone, and preventing bone overgrowth in juveniles, comprising a head adapted to abut and overlap the end of the stump, the outer surface of the head being free from sharp corners, at least the portion of the head adjacent to said end of the stump with a thickness of at least 1 mm. being formed of a porous polymeric material with a density of at least 0.912 g./c.c. interspersed with a network throughout its volume of interconnected pores with no straight paths longer than the diameter of the largest pore and adapted for human tissue to grow therein, said porous polymeric material having an average pore diameter ranging from 50 μm – 300 μm , the minimum pore volume being 30%, a non-porous cover on the portion of the outer surface of the head which projects beyond the end of the stump for preventing the pores from communicating with said portion of the outer surface.

4,007,495
PATELLO-FEMORAL PROTHESIS

Calvin H. Frazier, 1808 Verdugo Blvd., Glendale, Calif. 91208

Filed May 28, 1976, Ser. No. 690,986
Int. Cl.² A61F *1/24*
U.S. Cl. 3—1.91 **7 Claims**

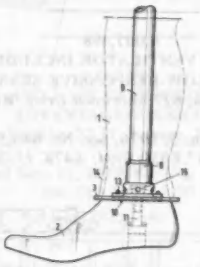


1. A patello-femoral prosthesis comprising a patellar prosthesis which is dimensioned and contoured complementarily to the natural patella and having one side thereof which is adapted to fit against and be secured to the inner surface of the natural patella, and a femoral prosthesis which is dimensioned and contoured complementarily to the portion of the outer surface of the natural femur which the natural patella normally overlies, said femoral prosthesis having one side thereof which is adapted to fit against and be secured to the outer surface of the natural femur, the opposite side of said femoral prosthesis having a substantially concave configuration, the opposite side of said patellar prosthesis having a substantially convex portion, said convex and concave portions having formed complementarily to and adapted to engage each other, connector means for connecting said prosthesis for sliding movement with respect to each other, said connector means comprising a substantially keyhole shaped slot formed in one of said prostheses, said slot having a pair of spaced walls forming a narrow entrance portion and an enlarged inner portion, and a complementarily formed collar button shaped projection carried by the other of said prostheses, said projection having an enlargement on the outer end thereof and a narrow portion disposed inwardly from said enlargement, said projection adapted to be mounted in said slot for sliding movement along said slot, with the engagement between said enlargement and slot preventing undesirable separation or dislocation of said prostheses with respect to each other during the use of said patello-femoral prosthesis.

4,007,496
CONNECTION BETWEEN A COSMETIC COVER AND A PROSTHETIC PART

Richard Glabiszewski, Duderstadt, Germany, assignor to Otto Boch Orthopadische Industries KG, Duderstadt, Germany

Filed Sept. 8, 1975, Ser. No. 611,497
Claims priority, application Germany, Sept. 16, 1974, 2444177
Int. Cl.² A61F *1/08, 1/06*
U.S. Cl. 3—2 **4 Claims**



1. Connection means between a cosmetic cover and a working part of a skeletal prosthesis comprising a connecting link fastened to the front end of said cosmetic cover with the surface of said link extending transversely across said front end, said link having at least two pin sockets that are contiguous to and run perpendicular to the connecting link surface, and connecting pins on said working part for connection with said pin sockets in such a way that said pin sockets are readily removable from said pins.

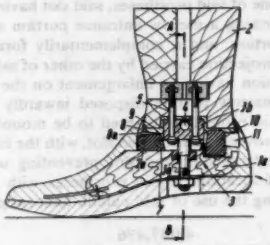
4,007,497
ARTIFICIAL FOOT WITH ANKLE JOINT

Werner Haupt, Duderstadt, Germany, assignor to Otto Boch Orthopadische Industries KG, Duderstadt, Germany

Filed Sept. 3, 1975, Ser. No. 609,995
Claims priority, application Germany, Sept. 5, 1974, 2442441
Int. Cl.² A61F *1/04, 1/08*
U.S. Cl. 3—33 **2 Claims**

1. An artificial foot and ankle joint, comprising a foot part having an upper surface including a plastic impregnated socket, an ankle part having a plastic impregnated lower surface including a centrally located plastic impregnated socket and surrounding plastic impregnated articulation surfaces, and a bifurcated joint connecting said foot part and ankle part, said bifurcated joint having a lower part which contains an articulation axis and is connected immovably into said foot part through said plastic impregnated socket of said

foot part, said bifurcated joint having an upper part made of elastic material and generally U-shaped in cross-section which contacts said axis from below, said upper part being connected to said ankle part through said plastic impregnated socket of said ankle part, an elastic articulator between said ankle part and said foot part contacting said plastic impregnated articulation surface of the ankle part, said articulator



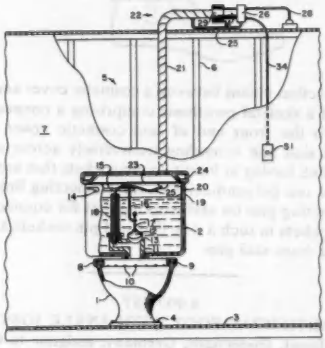
having a central opening for receiving said lower part of said bifurcated joint, said articulator having only a front dorsal projection and side rotation surfaces for cooperation with said plastic impregnated articulation surfaces of said ankle part, and a separate, exchangeable resilient member between said ankle part and said foot part and behind said articulator for dorsal plantar flexion, said resilient member contacting said plastic impregnated articulation surface of said ankle part.

4,007,498

TOILET VENTILATOR INCLUDING OVERFLOW-RESPONSIVE SENSOR

Raymond H. Pearson, 627 Sherwood Drive, Richardson, Tex. 75080

Filed Jan. 5, 1976, Ser. No. 646,570
Int. Cl.² E03D *9/04*; **A47K** *13/00*
U.S. Cl. 4—213 **1 Claim**



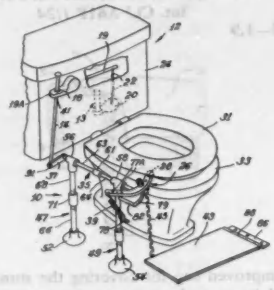
1. A toilet deodorizing accessary, said toilet including a toilet bowl and water tank, said water tank including a flushing mechanism and overflow duct, said accessary comprising an air duct in communication with the odorous air within said toilet, air suction means having an intake side and a discharge side, said intake side communicatively connected to said air duct, control means operable to initiate air flow through said air duct, whereby odorous air may be drawn from said toilet, said control means also operable to terminate said air flow, said control means including sensing means responsive to the water rise within said overflow duct, said sensing means having at least one electrically sensible parameter which is a function of said water rise within said overflow duct when said toilet is flushed, whereby said air flow may be terminated in response to said water rise in said overflow duct when said toilet is flushed.

4,007,499

COMMODE FLUSHING CONTROL APPARATUS

Teng Ke Lin, 2544 Berkshire Court, Waukegan, Ill. 60085

Filed Mar. 29, 1976, Ser. No. 671,899
Int. Cl.² E03D *5/08*
U.S. Cl. 4—249 **10 Claims**



1. Apparatus for controlling commode flushing mechanisms having a drain valve and valve trip device for raising the drain valve to its open position for water discharge purposes, comprising:

connecting means adapted to be connected to the trip device for moving between an initial position and a flushing position to cause the trip device to raise the drain valve to its open position;

spring means for moving said connecting means to its flushing position;

person-operated means attached to said connecting means for storing energy in said spring means and for releasing subsequently the energy from said spring means to move said connecting means toward its flushing position to open the valve;

latching means connected to said connecting means for attaching releasably said connecting means and said device for moving it and the valve against the force of water pressure acting on the valve until the water pressure acting on the valve equals the force applied by the spring means upon sufficient water discharge, whereby said spring means moves said connecting means after sufficient water discharge has taken place to release said latching means so that said connecting means becomes free of the trip device and the flushing mechanism can complete its normal flushing operation.

4,007,500

BATHTUB STOPPER

Arthur D. Thompson, and Imao Kaibara, both of London, Canada, assignors to Emco Ltd., London, Canada

Filed May 27, 1976, Ser. No. 690,715
Int. Cl.² F16K *31/44*; **F16L** *37/28, 29/00*
U.S. Cl. 4—295 **6 Claims**

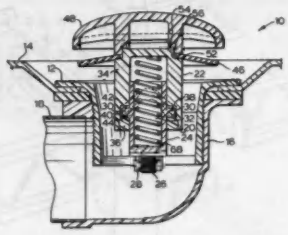
1. A bathtub stopper for closing the drain passage of a strainer cup of a bathtub comprising:

a. a main body consisting of first and second components adapted to telescope longitudinally with respect to one another between an extended position and a shortened position, said components also being rotatable with respect to one another about a longitudinal axis of said main body, said first component being manually engageable to be rotatably driven about said longitudinal axis, said second component being adapted to be secured to a strainer to locate said main body in an operative position with respect to a strainer,

b. closure means carried by said first component for closing

said drain passage when said main body is in said shortened position, said closure means being spaced from said strainer to open said drain passage when in said extended position,

c. continuous cam track means extending circumferentially of one of said components, said cam track means including crest and valley positions which are longitudinally and circumferentially spaced from one another,



d. cam follower means on the other of said components engaging said cam track whereby upon rotation of one component with respect to the other, the cam follower is guided along the cam track to locate said components in said shortened position when in engagement with a crest of said cam track and in said extended position when in engagement with a valley of said cam track.

4,007,501

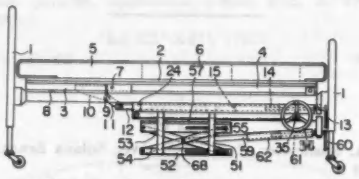
BED HAVING A BED PAN

Mikio Kato, Tokyo, Japan, assignor to Nippon Felt Co., Ltd., Tokyo, Japan

Filed Aug. 15, 1975, Ser. No. 605,015

Int. Cl.² A61G *7/02*

U.S. Cl. 5—90 **9 Claims**



1. A bed for a patient comprising a frame, a mattress having a bed pan mounting recess provided centrally therein, a bed pan including a pan seat, tank and a hollow front cover which front cover broadly covers around the excretory organ of the patient and only the periphery of which said front cover comes into contact with the skin of the patient ranging from the groin up to the lower abdomen, and support means for supporting said bed pan at an optional height to be in conformity with a degree of depression of the periphery of said bed pan mounting recess and to keep the buttocks of the patient never strongly touching said bed pan, wherein said pan seat and said front cover are disposed in such a manner that they interpose the body of the patient therebetween.

4,007,502

BED FRAME ASSEMBLY

Frank J. Mis, 9601 Robertson Ave., Oak Lawn, Ill. 60453

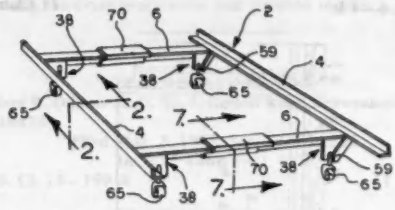
Filed Dec. 1, 1975, Ser. No. 636,360

Int. Cl.² A47C *19/02, 21/00*

U.S. Cl. 5—202 **10 Claims**

1. A bed frame adapted to support a spring and mattress assembly comprising a pair of spaced, parallel side-frame member means and at least one cross-frame member means extending between said side-frame member means, and means releasably securing the ends of said cross-frame member means to said side-frame member means, comprising:

female elements connected to one of said cross-frame and side-frame member means, and male elements connected to the other of said side and cross-frame member means, said male-female elements disposed in sliding telescoping engagement with each other and sloping downwardly and inwardly from the lateral sides of the bed frame, said



male-female elements defining bed-frame corner supports and being extendable and contractible laterally of said bed frame whereby said side-frame members being movable with the securing elements connected thereto are spreadable apart different distances widthwise of the bed frame, and the telescoping male-female elements being cross-wise vertically superposed and mutually supportive to each other and resisting bending moments imposed thereon.

4,007,503

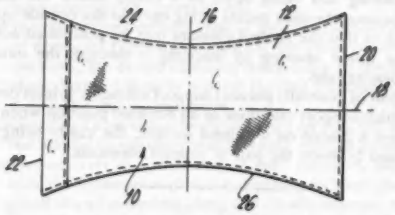
PILLOW AND CASE OF PHYSIOLOGICALLY ADVANTAGEOUS SHAPE

Bernard Currs Watkin, 32 W. Square, London SE. 11, England

Filed Dec. 11, 1975, Ser. No. 585,217

Int. Cl.² A47G *9/00*

U.S. Cl. 5—338 **1 Claim**



1. A pillow comprising a pillow case comprising first and second walls of flexible material each having a shape which is symmetrical about a centre line in the plane of the wall and whose width measured in a direction parallel to the centre line between opposite edges of the wall increases with increasing distance from the centre line measured in a longitudinal direction perpendicular to the centre line, the first and second walls being joined to one another at least along the said edges of the walls, each of the walls having a shape which is symmetrical about a line lying in the plane of the each of said walls being separately formed of fabric material wall and perpendicular to the centre line, each wall being bounded by the said longitudinal edges and by two straight transverse edges parallel to the centre line, the walls being joined together along at least one of the transverse edges of each wall, and a filling of rectangular configuration disposed in said pillow case whereby the pillow has a center portion of reduced dimensions under compression forming a relatively hard central area and the outer areas are relatively soft.

4,007,504

HIVE ENTRYWAY

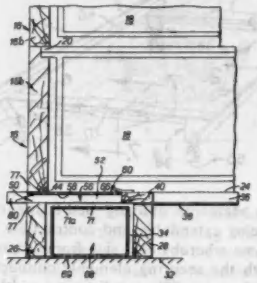
Ernest Harry West, Cowaramup, Australia, assignor to Laura J. West; Allan A. West; Lionel B. West, all of Cowaramup and Kenneth H. West, Margaret River, all of, Australia, part interest to each

Filed July 11, 1974, Ser. No. 487,732

Claims priority, application Australia, July 11, 1973, 58008/73

Int. Cl.² A01K *47/06*

U.S. Cl. 6—4 R **11 Claims**



1. A bee hive comprising:

a. a hive body having an interior open to access by bees via a hive entryway;

b. a hive floor closing a lower end of the hive body;

c. means forming an inside opening in the hive floor;

d. slide means mounted at the floor for slidably receiving and retaining a generally planar control element in a generally horizontal position for controlling bee activity at the entryway;

e. means forming an outside opening in an upright side wall of the hive body, the outside opening being positioned to allow bee entry to the hive interior first through the outside opening and then through the inside opening, the outside opening being at a lower elevation than the inside opening and being open to a cavity below the inside opening, the slide means being open to the outside opening so that the control element may be positioned across the inside opening by inserting it through the outside opening; and

f. a pair of generally parallel support elements at least one of which support said floor in an elevated position when the hive is placed on a ground surface, the cavity being defined between the pair of support elements.

4,007,505

FLEXIBLE STABILIZER FOR UNDERWATER VEHICLE

James A. Nowatzki, Northridge, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 10, 1975, Ser. No. 630,570

Int. Cl.² B63B *21/52*

U.S. Cl. 9—8 R **3 Claims**

1. In combination with an underwater instrumented vehicle having an elongated cylindrical hull adapted to operate with its longitudinal axis in a vertical position, programmed to alternate between powered ascents and sinking descents, having reduced diameter probe means at the upper end of the hull and propeller means at the lower end, a drag and spin producing device comprising:

a substantially conical member formed of flexible plastic material and having a central aperture through which said probe means extends in press fit relation;

said member being segmented into a plurality of vanes by a like plurality of slots extending inwardly from the peripheral edge of said member and terminating short of said central aperture, said slots extending along lines tangential to said central aperture whereby said vanes are adapted to be twisted, upon passage of said vehicle through water, to assume a pitch which induces rotation of said device and said vehicle about said longitudinal axis;

said vanes being adapted to flex outwardly to a drag increasing position in response to said sinking descents of said vehicle and to flex inwardly to a drag reducing streamlined position in response to said powered ascents of said vehicle.

4,007,506

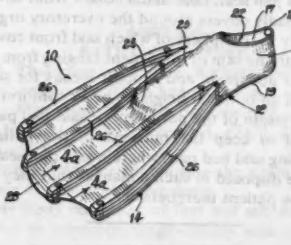
SWIM FIN

Philip A. Rasmussen, 269 Pacific Ave., Solana Beach, Calif. 92075

Filed Dec. 18, 1975, Ser. No. 642,076

Int. Cl.² A63B *31/10*

U.S. Cl. 9—309 **9 Claims**



1. A swim fin comprising:

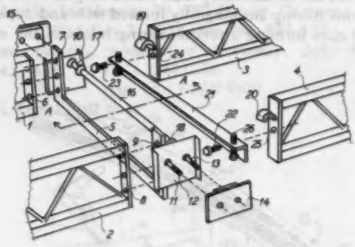
a foot portion and a blade portion, said blade portion including a plurality of transversely spaced longitudinally extending ribs that are connected to each other by web means said ribs having means that produce a reverse curvature in their configuration when one end of the rib is bent into a curve, said means comprising a plurality of elongated members juxtaposed upon each other.

4,007,507

BRIDGE COMPOSED OF INDIVIDUAL SECTIONS ASSEMBLED BY MEANS OF AN ASSEMBLING UNIT

Carl E. Hansen, Egegaardsvej 33, Roedovre, Denmark (DK-2610)

Filed Nov. 11, 1975, Ser. No. 630,812
Int. Cl.² E04C 3/02
U.S. Cl. 14—17 6 Claims



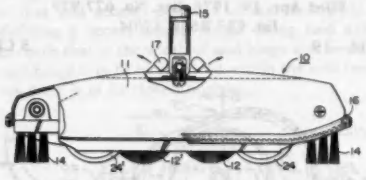
1. A bridge composed of individual sections assembled by means of an assembling unit whose supporting elements comprise two lateral beams, preferably lattice girders, wherein a main cross beam is bolted to the end of one of two adjoining bridge sections attached to the end of the following adjoining bridge section by a hinge means having a substantially horizontal axis, and a substantially vertical supporting leg is attached to each end of said cross beam.

4,007,508

MANUAL FLOOR SWEEPER

Akio Ooyachi, Tokyo, Japan, assignor to Hiroshi Watanabe, Tokyo, Japan

Filed Dec. 2, 1975, Ser. No. 636,967
Claims priority, application Japan, Dec. 3, 1974, 49-146390[U]
Int. Cl.² A47L 11/33
U.S. Cl. 15—42 6 Claims



1. A floor sweeper of the manual type including a casing having a hollow space therein, a pair of front and a pair of rear wheels rotatable on the floor to be swept, and one pair of roll brush brooms arranged at a center portion of the hollow space of said casing and juxtaposed longitudinally in parallel and adjacent to each other in a manner to rotate inwardly, as said wheels rotate, so as to sweep up the dust on the floor into the hollow space of said casing,

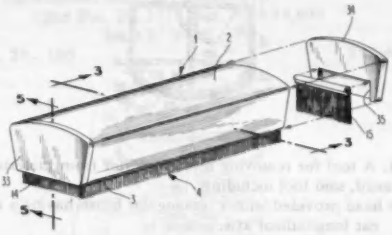
wherein the improvement comprises: two substantially enclosed spaced parallel housings one on each side of said casings; a gear train accommodated in each of said housings and including front and rear drive gears positioned in each of said housings coaxially with each pair of said front and rear wheels, front and rear brush actuating gears interposed between said front and rear drive gears supported coaxially with said roll brush brooms, and coactive means interposed between said front and rear brush actuating gears spacing said roll brush brooms and for effecting the inward rotation of said brush actuating gears and accordingly said roll brush brooms; and selective means interposed between said drive gears and said brush actuating gears for selectively effecting power transmission in accordance with the forward and backward movement of said floor sweepers, such that the drive power from the drive gears, which are located at a front position with respect to the direction of advance of said floor sweeper, may be transmitted to the adjacent brush actuating gears by said selective means and to the brush actuating gears of the far side by way of said coactive means, thus allowing the drive gears in the rear position to idle.

4,007,509

BLACKBOARD ERASER

Oliver R. Odhner, R.D. No. 2, Gerloff Road, Schwenksville, Pa. 19473

Filed Mar. 3, 1975, Ser. No. 554,503
Int. Cl.² A46B 3/02, 9/02
U.S. Cl. 15—159 A 11 Claims



1. In a blackboard eraser:

an elongated handle to be gripped by the hand and guided over the surface of the blackboard, the handle having a bottom surface the locus of which is planar and adapted to face the blackboard during the erasing operation;

means on the bottom surface for removing chalk from the blackboard, said means comprising a plurality of parallel cleaning rows, and each row being comprised of a plurality of fiberglass filaments, the rows and the surface forming a plurality of channels; and

at the respective opposite ends of the rows, a blocking row of fiberglass filaments closing off the channels between the rows, the closed channels functioning to confine the chalk dust and thereby prevent the dust from falling away during the erasing operation;

a pair of end caps respectively disposed on opposite ends of the handle to maintain said blocking rows in position;

on respectively the same end of each filament, means to lock the filaments together comprising at least one elongated strand extending along and closely adjacent to each said filament end and an enlarged, elongated bead of hardened adhesive encapsulating the strand and each of said ends; and

a plurality of grooves formed in said handle and open to said surface, each groove containing a cleaning row including said enlarged bead and a portion of the filaments thereof.

10. In a blackboard eraser:

an elongated handle to be gripped by the hand and guided over the surface of a blackboard, the handle having a bottom surface the locus of which is planar and adapted to face the blackboard when the handle is guided during the erasing operation;

means on the bottom surface for removing chalk dust from the blackboard comprising a plurality of cleaning groups, the groups being spaced apart to provide spaced channels therebetween for receiving the chalk dust during the cleaning operation and each group being comprised of a plurality of short fiberglass filaments all of said filaments being of uniform length; and

means on the handle and extending around the periphery of

said bottom surface and also extending from the bottom surface to the ends of the filaments to close off said channels whereby to prevent dust from dropping out of the channels when the device is moved over the board for the cleaning operation.

4,007,510

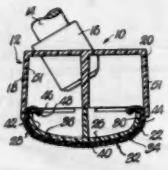
BRUSH HEAD

Baxter I. Scoggin, Jr., Kansas City; Woodrow E. Vaughan; Gerald D. Reed, both of Independence; Don W. Cartner, Kansas City, all of Mo.; David E. Hill, and Jack E. Briar, both of Gardner, Kans., assignors to Modern Plastic Sales, Independence, Mo.

Filed July 9, 1975, Ser. No. 594,338

Int. Cl.² A46B 7/04, 9/02

U.S. Cl. 15—176 **8 Claims**



1. A tool for removing foreign matter from material to be cleaned, said tool including:

a head provided with a rectangular brush having a rectilinear longitudinal axis,

said brush having:

a pair of opposed, transverse marginal edges,

a first longitudinally extending marginal edge,

a second longitudinally extending marginal edge,

a linear arrangement of ridges and valleys in parallelism with said longitudinal edges,

a transversely convex configuration,

a compressible, resilient, convex backup pad, each ridge comprising a continuous series of relatively stiff, short, densely disposed filaments sloping toward said first longitudinal edge whereby, when the brush is pulled in one direction with said first longitudinal edge leading, while the brush is held in pressing engagement with said material, the foreign matter is picked up by the filaments, and when the brush is pushed in the opposite direction with the second longitudinal edge leading, while the brush is held in pressing engagement with said material, the foreign matter is dislodged from the filaments, and

an elongated, rigid backup panel for the pad,

said panel being transversely convex to the same degree as the pad from said first longitudinal marginal edge to said second longitudinal marginal edge of the brush,

said pad and brush being of uniform thickness throughout the entire curvature of said panel.

4,007,511

VEHICLE WINDSHIELD WIPER BLADE ASSEMBLIES

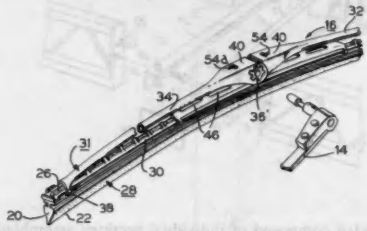
Raymond A. Deibel, West Falls, N.Y., assignor to Trico Products Corporation, Buffalo, N.Y.

Filed Apr. 7, 1975, Ser. No. 565,641

Int. Cl.² B60S 1/02

U.S. Cl. 15—250.42 **1 Claim**

1. In a windshield wiper blade assembly for motor vehicles comprising a flexible wiping element, an articulated pressure distributing superstructure for supporting said wiping element comprising a pair of primary levers pivoted at their inboard ends to a pin member and slidably engaging at their outboard ends the flexible wiping element adjacent its outboard ends, a torsion spring surrounding the pin member and having its ends engaging the lever members to urge the outboard ends thereof in the direction of the flexible wiping element, a third lever member pivotally supported on said pin member intermediate the ends of said third lever and having its ends slidably engaging the wiping element at points spaced substantially from the free ends of the wiping element, and means for applying pressure at said pin dominating the urge of said torsion spring characterized in that the primary levers are each tubular in cross section for substantially their entire length, the adjacent end portions having an integrally formed web and depending apertured ears forming a torsion spring retainer, the ears of



one of said primary levers being interfittable with the ears of the other of said primary levers, the apertures being in transverse alignment to receive said pin member, the outboard ends of said primary levers having integrally formed claws for slidable engagement with said wiping element, said third lever comprising an elongate web portion having depending sides at each edge, said web portion having spaced-apart openings along its length and opposed claws at each end slidably engaging the wiping element, said openings being elongated in the direction of the longitudinal axis of said third lever, the open area of the web of said third lever being greater than the solid area.

4,007,512

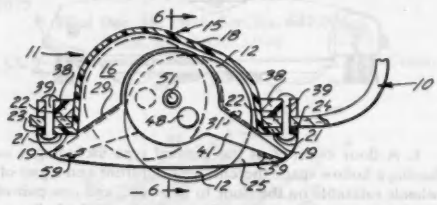
RETRACTABLE LUGGAGE ROLLER ASSEMBLY

John Hugh Oland, Calgary, Canada, assignor to Oland Industries Limited, Calgary, Canada

Filed Apr. 19, 1976, Ser. No. 677,979

Int. Cl.² B60B 33/04

U.S. Cl. 16—19 **5 Claims**



1. A retractable roller assembly for portable luggage pieces and the like comprising:

a. a casing adapted to be secured to the luggage piece having a pair of parallel spaced apart planar side walls and a circumferential wall, the circumferential wall having an elongated opening,

b. the side walls having a pair of co-axially disposed circular sockets in inner surfaces thereof,

c. a yoke having a pair of cheek-plates rotatably fitting in the sockets and a bifurcated lever connecting the cheek-plates and extending from the opening for rotating the cheek-plates about a common axis,

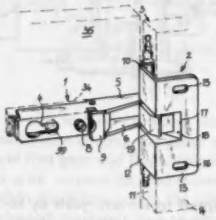
d. a roller mounted between the cheek-plates for rotation about an axis eccentric to said common axis, the roller

having a diameter such that the roller is moved between a hidden position entirely within the casing and a position projecting through the opening in the base when the lever is swung from one end of the opening to the opposite end of the opening.

4,007,513
SINGLE-PIVOT HINGE

Ernst Zernig, Muhlenweg 29, 587 Hemer, Germany

Filed July 3, 1975, Ser. No. 593,333
Claims priority, application Germany, July 4, 1974, 2432143; Aug. 28, 1974, 2441258
Int. Cl.² E05D 9/00
U.S. Cl. 16—128 R **7 Claims**

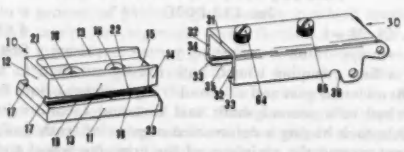


1. A hinge for a flush-type door comprising:
a first plate member having two integral, elongate, generally flat, and mutually perpendicular portions for mounting to one of the elements to be hingedly connected with a first of said portions abutting an edge of said one element and the other of said portions abutting a face of said element which adjoins said edge,
a pivot means supported along a free longitudinal edge of said first portion of said first plate member,
a hinge arm pivotally supported on said pivot means for mounting to a face of the other said element to be hingedly connected and having a width measured along the axis of said pivot means which is substantially less than the length of said first plate member also measured along said axis,
said first and second portions of said first plate member defining a recess whose length along said axis slightly exceeds that of the width of said hinge arm so as to permit said hinge arm to be received within the said recess when the door is in its closed position.

4,007,514
FIXED HINGE FITTING

Luciano Salice, Carimate (Como), Italy, assignor to S.A.R.L. Salice France, Nice, France

Filed Jan. 7, 1976, Ser. No. 646,983
Claims priority, application France, Jan. 17, 1975, 75.01535
Int. Cl.² E05D 7/04
U.S. Cl. 16—129 **11 Claims**

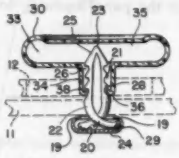


1. A hinge fixture comprising:
a base plate attachable to a wall member, the base plate having side walls and a pair of longitudinally extending grooves formed in each of the side walls;
a hinge fitting of generally U-shaped cross-sectional configuration adapted to fit over the top of the base plate, said hinge fitting having a pair of side walls which terminate in inwardly extending longitudinal flanges receptive in said grooves;
the main web of the hinge fitting having a pair of longitudinally spaced screws threaded therein for engagement with the upper surface of the base plate, one of said screws being effective to lock the hinge fitting to the base plate and the other of the screws being constructed and arranged to vary the angular position of the hinge fitting with respect to the base plate;
said longitudinally extending grooves in the base plate being dimensioned with respect to the flanges of the hinge fitting to permit limited angular adjustment of the hinge fitting with respect to the base plate.

4,007,515
GARMENT FASTENER

Joseph F. Agnelli, Medford, N.Y., assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Dec. 29, 1975, Ser. No. 644,603
Int. Cl.² A44B 1/28
U.S. Cl. 24—103 **3 Claims**



1. A fastener for detachable attachment through one or more layers of material, said fastener formed of a female member and a male member,
said female member formed with a hollow neck section open at one end and formed about such opening with a flanged rim that extends into the opening,
said male member formed of a pin shaped as a U-section of two resilient legs externally joined together at a first end section of each leg to form a common external point, with each of the second end sections of each leg slidably mounted in a common cap so as to permit flexing of the two legs towards or away from each other, with each said second end section of each leg mounted in said cap so as to apply spring bias to flex each of said legs away from the other said leg, said cap formed with a flange that restricts relative movement of the enclosed said second end sections to the cap in the axial direction of the said legs,
said legs each formed externally with serrated surfaces so as to frictionally grip the rim of the female member when the leg sections are inserted in the neck section of the female member,
said external point of the male member serving as a means of piercing the layers of material when the fastener is assembled with the female member located on one side of the material and the male member inserted into the female member from the second opposed side of the material.

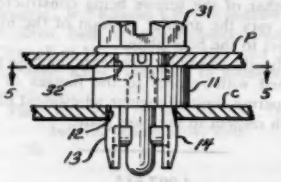
4,007,516
QUARTER TURN LOCKING FASTENER DEVICE

Ronald A. Coules, Barrington, Ill., assignor to Richco Plastic Company, Chicago, Ill.

Filed May 19, 1975, Ser. No. 578,474
Int. Cl.² A44B 17/00; F16B 13/04
U.S. Cl. 24—221 R **5 Claims**

1. A quarter turn fastener comprising a socket part and a

stud part for removably securing an apertured panel on and spaced apart from an apertured chassis, flexible means on the socket part for snap locking said socket part in said chassis aperture, means on the socket part for spacing said panel from said chassis, a head on the stud part adapted to bear upon said panel, a shaft depending from said head and adapted to extend through said panel aperture and into said socket part, cooperating ribs on the stud part and shouldered grooves on the socket part for locking and unlocking said parts together upon selective rotation of said stud part relative to said socket part, said snap locking means being adaptable to secure said socket part in said chassis aperture when the stud part is disposed in locking position, and means on the stud part adjacent to the head engageable in the panel opening to prevent shifting of the panel.

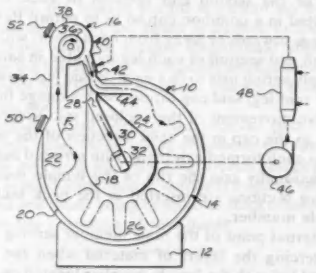


4,007,517

HEAT TREATMENT OF TEXTILE FABRIC PRIOR TO WET PROCESSING

James Keith Turner, Lincolnton; William Cleere Sturkey, Charlotte, both of N.C., and Christoph W. Aurich, Clemson, S.C., assignors to Gaston County Dyeing Machine Company, Mount Holly, N.C.

Continuation of Ser. No. 489,404, July 17, 1974, abandoned. This application Aug. 13, 1975, Ser. No. 604,167
Int. Cl.² D06B 3/28
U.S. Cl. 26—18.5 **3 Claims**



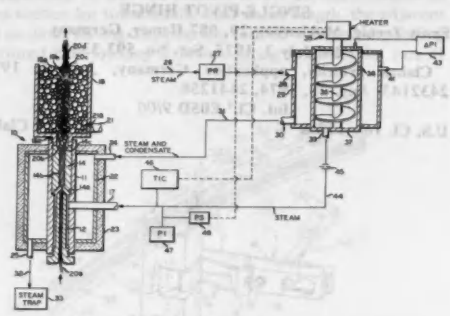
1. In the art of heat treating textile fabric for bulking or shrinking the same prior to wet processing, the improvement which comprises the combined steps of handling said fabric as a rope in endless loop form by confining a major portion of the fabric loop as a plaited accumulation in a chamber from which the loop is progressively withdrawn and then returned, recirculating the textile fabric endless loop from and to said plaited accumulation free of nip constraint under an aspiration influence induced with a jetted inert gas while applying heat for said treatment to said textile fabric during such recirculation, and continuing said heat application and recirculation until the desired bulking or shrinking has been effected.

4,007,518

STEAM SUPPLY APPARATUS

Harold A. Larson, Greenville, S.C., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 25, 1975, Ser. No. 607,328
Int. Cl.² D02G 1/12
U.S. Cl. 28—1.6 **6 Claims**



1. Apparatus adapted to texture yarn by the use of steam which is supplied at a predetermined temperature and free of condensate, comprising:

yarn texturing apparatus in which yarn to be textured is contacted with steam so as to impart turbulence to the yarn and texture same, said yarn texturing apparatus being provided with a jacket;

a heater adapted to elevate the temperature of a fluid passed therethrough, said heater having an inlet and an outlet;

a steam condensate separator having an inlet to receive steam and a first outlet through which steam can be removed, said separator also having a second outlet to remove condensate;

means connecting the first outlet of said separator to the inlet of said heater;

first conduit means connected between the outlet of said heater and said yarn texturing apparatus to pass condensate-free steam to said yarn texturing apparatus;

temperature sensing means connected to said first conduit means to measure the temperature of steam therein;

control means responsive to said temperature sensing means to regulate said heater to maintain the temperature of steam in said first conduit means constant; and

second conduit means connected between the first outlet of said separator and said jacket to pass steam and condensate from said separator to said jacket.

4,007,519

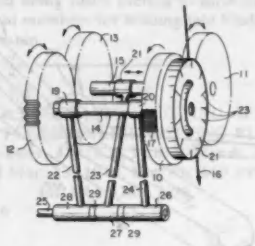
INDICATING DEVICE FOR YARN CRIMPING WHEEL TEETH SPACING ADJUSTMENT

Charles M. Rice, Candler, N.C., assignor to Akzona Incorporated, Asheville, N.C.

Filed July 11, 1975, Ser. No. 594,940
Int. Cl.² D02G 1/14
U.S. Cl. 28—1.8 **4 Claims**

1. An apparatus for crimping yarns comprising a first gear and a first crimping wheel, both fixedly attached to a first shaft; a second gear and a second crimping wheel, both fixedly attached to a second shaft; said first and second crimping wheels each having a determined number of teeth uniformly spaced around the periphery of the crimping wheel and said first and second gears each having another and different determined numbers of teeth uniformly spaced around the periphery of the gear; means for engaging and disengaging said first and second gears and said first and second crimping wheels; means to rotate said first gear; a device attached to said first

crimping wheel to rotate in conjunction therewith; graduated markings on one face of the device corresponding to points along the periphery of said first crimping wheel; and an index mark on said second crimping wheel correlative to said graduated markings on said first crimping wheel, whereby the peripheral spacing between the teeth of said first crimping wheel



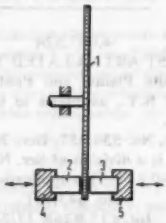
and the teeth of said second crimping wheel, when engaged, can be changed by disengaging the gears and crimping wheels and rotating said first gear and first crimping wheel a predetermined amount with respect to said second gear and second crimping wheel in accordance with the alignment of the index mark and graduated markings and re-engaging the crimping wheels and gears.

4,007,520

PROCESS FOR THE PRODUCTION OF AN ELECTRIC STACK OR LAYER CAPACITOR

Hubert Kraus, Regensburg, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Dec. 9, 1975, Ser. No. 639,120
Int. Cl.² H01G *4/30*
U.S. Cl. 29—25.42 **9 Claims**



1. In a process of producing capacitors in which synthetic dielectric layers carrying metal layers thereon are wound in a stretched state about a drum to form a mother capacitor, in which individual capacitors are formed from the mother capacitor by sawing through the mother capacitor, and in which due to the development of heat during sawing the capacitor layers contract in the region of sawing causing breaking of the metal layers to form insulating islands, the improvement therein comprising the step of:

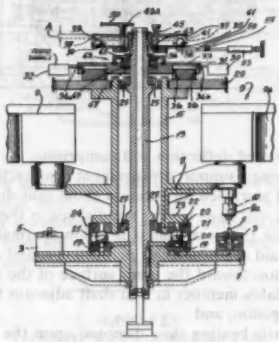
applying an insulating lubricant to the saw blade and performing said sawing step such that said lubricant impregnates the capacitor being formed and thereby increases its dielectric strength.

4,007,521

AUTOMATIC PRECISION WORKING TOOL

Andreas Keusch, Brossard, Canada, assignor to Hans Seiler, Aargau, Switzerland

Filed Apr. 23, 1976, Ser. No. 679,488
Int. Cl.² B23P *23/00*; B23G *1/20*
U.S. Cl. 29—38 C **8 Claims**



1. An automatic precision apparatus comprising;

an elongated rotatable central shaft concentric with and encased by a fixed outer cylinder;

a rotary workpiece table fixed to said central shaft adjacent one end of said central shaft;

a round tool holder table fixed to said cylinder adjacent one end of said cylinder and disposed in spaced relationship with said rotary table and in parallel arrangement with said rotary table;

a plurality of spaced tool holders disposed around said round table;

a plurality of equally spaced workpiece holders disposed on the one surface of said rotary table facing said round table;

each tool holder being precisely aligned with a respective one of said workpiece holders and being alignable with every other one of said workpiece holders;

means for moving said shaft to a second position relative to said cylinder from a first position relative thereto, and from said second position back to said first position;

means for rotating said shaft relative to said cylinder when the shaft is in said first position relative to said cylinder; and

means for releasably attaching said shaft to said cylinder when said shaft is in said second position relative to said cylinder;

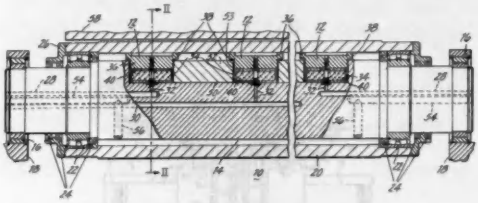
whereby, when said shaft is in said first position, said rotary table is rotatable, with said shaft, relative to said round table, fixed to said cylinder, to move each workpiece holder from their positions adjacent one of the tool holders to a new position adjacent another one of the tool holders; and

whereby, when said shaft is in said second position, a closed vibration path is provided from each workpiece, through its respective workpiece holder, through said means for releasably attaching, through said cylinder, through a respective tool holder adjacent each workpiece holder, through the tool in the respective tool holder and back to the workpiece.

4,007,522
CONTROLLED DEFLECTION ROLL ASSEMBLY

Peter Hold, Milford, and John Crossley Hinchcliffe, Cheshire, both of Conn., assignors to USM Corporation, Boston, Mass.

Filed May 26, 1976, Ser. No. 690,052
Int. Cl.² B21B 13/02
U.S. Cl. 29—116 AD 12 Claims



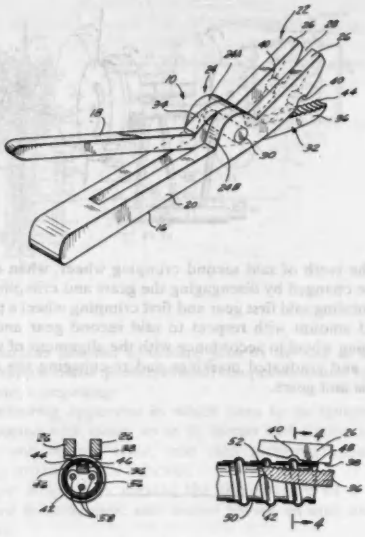
1. A controlled deflection roll comprising:
a shaft having a support arrangement near each end thereof;
a shell roll journaled for rotation about said shaft, said shell roll and said shaft having a radial space therebetween;
at least one piston mounted in a longitudinally extending slot in said shaft, said slot permitting radial movement of said piston toward the inner surface of the shell roll;
an expandable member in said shaft adjacent the inner end of said piston; and
a hydrostatic bearing shoe disposed upon the outer end of said piston extending into said space and facing the inner surface of said shell roll;
said slot permitting said piston to pivot as it moves in the radial direction while preventing movement of the piston in a circumferential direction with respect to said shaft.

4,007,523
B-X CABLE PLIERS

Archangel J. Bianco, P.O. Box 93, Shores-Road, Brookside, N.J. 07926

Filed June 9, 1975, Ser. No. 584,812
Int. Cl.² B21F 13/00; B26B 27/00
U.S. Cl. 30—90.2 6 Claims

1. A device for cutting B-X cable having a convoluted metal wrapping thereon, said device comprising first and second pivotally interconnected operating members each having first and second end portions with the first end portions thereof being located on one side of the pivotal connection between said members and defining handles; said second end portion of said first operating member being bifurcated to define two parallely extending spaced cutting jaws; said cutting jaws having laterally spaced free end portions remote from said pivotal connection and each having a lower cutting surface which is relatively flat in cross-section and which is slightly convex along the length of the jaw from adjacent the pivotal connection between said operating members to said free end of the jaw spaced from said pivotal connection; said lower surface of said cutting jaws each having an arcuately shaped downwardly opening notch formed therein dimensioned to receive and closely mate with at least one generally complementary convolution on the B-X cable; said second end portion of said second operating member defining a single cutting jaw and being located between the jaws of said first operating member for pivotal movement with respect thereto; said cutting jaw of the second operating member being relatively thin and having an upper cutting surface for cooperating with the lower surface of said first operating member to cut the B-X cable, said single cutting jaw of the second operating member being dimesioned to be inserted longitudinally into one end of a length of of B-X cable and its upper surface being serrated transversely of the length of the jaw to enable the jaw to firmly grip the metal wrapping during cutting; said upper surface of said single jaw, including the serrations thereon, being concave in shape transversely of its length thereby to define two spaced cutting edges respectively associated with the spaced cutting jaws on the first operating member; whereby when said single cutting jaw is inserted in the end of a length of B-X cable with the notch in said cutting jaws of the first operating



member firmly engaging a convolution of the B-X cable, pivotal movement of said handle members toward each other will move the single cutting jaw of said second operating member between the cutting jaws of the first operating member to cut the B-X cable.

4,007,524
CAST ARTICULATED TOOL

Karl Hannes, White Plains, and Paul C. Rossi, Franklin Square, both of N.Y., assignors to Coats & Clark, Inc., Stamford, Conn.

Division of Ser. No. 536,357, Dec. 26, 1974, Pat. No. 3,965,779, which is a division of Ser. No. 434,106, Jan. 17, 1974, Pat. No. 3,880,021. This application Dec. 23, 1975, Ser. No. 643,701
Int. Cl.² B26B 13/28
U.S. Cl. 30—266 7 Claims

1. A cast articulated shearing tool comprising first and

second cast members each having a shearing blade on one end thereof, said first member having a tapered aperture extending therethrough spaced from the respective blade, said second member having a pin with an enlarged head extending from one side thereof spaced from the respective blade and being integral with said second member, said pin being tapered with its larger diameter end toward said second member, the tapered portion of said pin corresponding in form to the form of said aperture and being fitted therein to form an articulated joint between said members for holding said blades in relative shearing relationship.

4,007,525

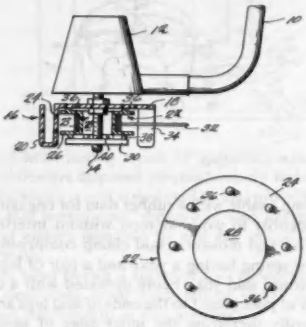
SPOOL FOR A VEGETATION CUTTING APPARATUS HAVING A FLEXIBLE LINE CUTTING ELEMENT

Gordon Francis Utter, 32019 E. I-10, Redlands, Calif. 92373

Filed Mar. 23, 1976, Ser. No. 669,499

Int. Cl.² B26B *7/00*

U.S. Cl. 30—276 **4 Claims**



1. An improved spool for a vegetation cutting apparatus of the type having a drive shaft, a rotatable member for housing said spool, a flexible line extending from the spool through an opening in said member, and adjustable securing means joined to said shaft for retaining the spool within said member, said spool comprising:

a central support portion having an aperture therein for receiving said drive shaft;

a first flange located at one end of said support portion;

a plurality of spaced projections located on an outer surface of said flange;

a second flange located at the opposite end of said support portion and adapted to be engaged by said securing means to cause the projections to engage said rotatable member whereby the spool is selectively joined with said member in rotatable relationship.

4,007,526

LAWN-EDGE TRIMMER WITH DETACHABLE HANDLE

Max Langenstein, Illertissen, Germany, assignor to Max Langenstein Feld- und Gartengerate, Illertissen, Germany

Filed May 7, 1976, Ser. No. 684,013

Claims priority, application Germany, May 10, 1975, 2520873

Int. Cl.² B26B *25/00*

U.S. Cl. 30—276 **10 Claims**

1. A lawn-edge trimmer comprising:

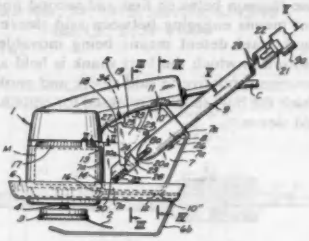
a housing rigid with a laterally extending grip at the top thereof and with a generally horizontal shield plate at the bottom thereof;

a motor in said housing provided with a switch including a spring-biased trigger on said grip depressible to energize said motor;

a rotatable cutter underneath said shield plate driven by said motor;

a mounting member detachably secured to said housing between said grip and said shield plate;

a tubular stem extending inclinedly upwardly from said mounting member and terminating in a handle above the level of said grip;



an ancillary actuator for said switch on said stem adjacent said handle; and

link means operatively connecting said actuator with said trigger, said link means including a force-transmitting element movably held in said stem.

4,007,527

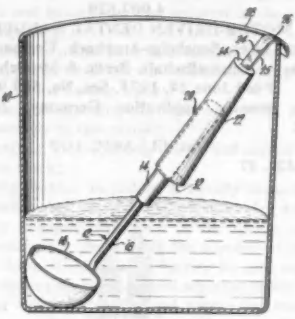
UTENSIL RETAINING MEANS

Edward A. Tibbs, 59 Townsend Ave., Newburgh, N.Y. 12550

Filed July 7, 1975, Ser. No. 593,577

Int. Cl.² A47J *43/28*

U.S. Cl. 30—327 **9 Claims**



1. In combination, a utensil having a handle and means for supporting said utensil within a cooking vessel, said means for supporting said utensil comprising an elongated hollow means having one open end, said hollow means loosely encompassing said handle, and hook means on said means for supporting said utensil, said hook means being adapted to engage the rim of said cooking vessel.

4,007,528

HIGH SPEED BONE DRILL

John J. Shea, and Harry Phillips, both of P. O. Box 4360, Memphis, Tenn. 38104

Filed Oct. 22, 1975, Ser. No. 624,661

Int. Cl.² A61C *1/08*

U.S. Cl. 32—26 **4 Claims**

1. A high speed drill comprising

a burr having an elongate shank,

a hollow casing,

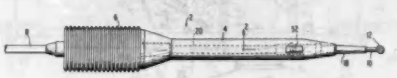
a drive motor in said casing,

a drive member rotatably supported in said casing and drivingly connected at one end to said motor, said drive

member having an elongate hollow tubular portion at the other end thereof for receiving said burr shank which slidably fits therein, means at the inner end of said hollow tubular portion for drivingly connecting said burr shank thereto,

a sleeve surrounding the drive member and slidable lengthwise thereon between first and second positions,

detent means engaging between said sleeve and said burr shank, said detent means being movable between one position in which the burr shank is held against endwise movement relative to said sleeve and another position in which the burr shank is released for endwise movement in said sleeve,



said sleeve in the first position thereof retaining said detent means in said one position and in the second position thereof releasing said detent means so that they are free to move to the other position thereof,

resilient means for urging said sleeve towards said first position, and a finger piece movably supported on said casing engageable with said sleeve for moving the same to said second position,

a rotary bearing member between the casing and the hollow tubular portion of the drive member, the elongate hollow tubular portion of said drive member projecting outwardly beyond said casing, and providing support for said burr shank along a substantial portion of its length.

4,007,529

MOTOR-DRIVEN DENTAL HANDPIECE

Ernst Otto Fleer, Bensheim-Auerbach, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed June 24, 1975, Ser. No. 589,923

Claims priority, application Germany, July 1, 1974, 2431472

Int. Cl.² A61C *1/10*

U.S. Cl. 32—27 **13 Claims**

1. In a dental handpiece including an electrical motor; an essentially cylindrical housing for receiving said motor; a supply hose containing an energy supply conduit for said motor; at least one cooling media supply conduit; connector means for attaching said supply hose to one end of said housing; a rotatable drive shaft projecting from the other end of said housing; a gripping member for the handpiece, exchangeably and detachably mounted to said housing and having a power-transmission shaft engaging with said drive shaft; a head portion having a work tool provided at the end of said gripping member remote from said housing and coupled to said power shaft; said cooling media supply conduit leading from said connector means to said head portion; the improvement comprising: said cooling media supply conduit being divided into at least two fixedly displaced conduit sections respectively extending along said housing and said gripping member; and coupling means positioned concentrically to said drive shaft for interconnecting said conduit sections intermediate said housing and said gripping member; said gripping member being rotatably arranged with respect to the portion of said housing holding said drive shaft.

4,007,530

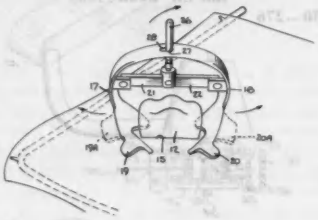
QUICK-RELEASE DENTAL CLAMP

Carmine Gaccione, 4 John Jay Place, Rye, N.Y. 10580

Filed Sept. 16, 1975, Ser. No. 613,912

Int. Cl.² A61C *5/12*

U.S. Cl. 32—36 **6 Claims**



1. A clamp usable with a rubber dam for engaging a tooth to permit a dentist to work thereon without interference from mouth saliva and moisture, said clamp comprising:

A. a bow spring having a yoke and a pair of legs depending therefrom, said yoke being provided with a center hole;

B. a pair of jaws joined to the ends of said legs and extending forwardly therefrom the inner edge of said jaws being contoured to engage said tooth, said bow spring having a normal bias maintaining said jaws in a spread-apart passive state; and

C. a trigger mechanism constituted by a pair of links hinged to a trigger head, the ends of said links being pivoted to said legs whereby in said passive state said links bridge said legs to assume a colinear relationship, a trigger pin anchored in said head and extending upwardly through said yoke hole, whereby when said legs are pressed inwardly against the tension of the spring to cause said clamp to assume an activated state, the pin rides up the hole and the jaws are caused to engage said tooth, and releasable means to hold said pin to maintain said activated state, which means, when actuated, frees said pin, whereby when said releasable means are actuated to fire said trigger mechanism, said pin rides down the hole and the jaws are immediately retracted from the tooth.

4,007,531

DUAL DENTURE MODEL SURVEYOR

Earl L. Anderson, P.O. Box 1601, Grand Rapids, Mich. 49501

Filed May 22, 1975, Ser. No. 579,932

Int. Cl.² A61C *3/00*

U.S. Cl. 32—67 **7 Claims**

1. A dual denture model surveyor, comprising

a base,

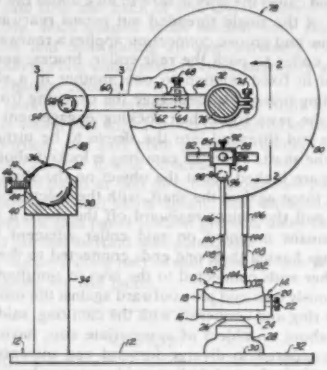
a denture model table mounted on said base and having means thereon for holding a denture model in a substantially horizontal position,

an upright structure mounted on said base in spaced relationship to said table,

an elongated extensible support extending forward from said upright structure and having a rearward end portion connected to said upright structure and having a forward end portion with a transverse pivotal connection thereon movable toward and away from said table,

and a dual tool head tiltably mounted on said forward end portion at said pivotal connection,

said tool head having thereon a pair of longitudinal slideways disposed in planes substantially parallel to said extensible support in laterally spaced relationship, and also having a pair of longitudinal sliders movable back and forth along said longitudinal slideways,



said tool head having a pair of oppositely-extending lateral slideways disposed perpendicularly to said longitudinal slideways and connected to and movable unitarily with said longitudinal sliders and also having a pair of lateral sliders movable to and fro along said lateral slideways,

said tool head having a surveyor tool holder mounted on and depending from each lateral slider in laterally-spaced relationship to one another.

4,007,532

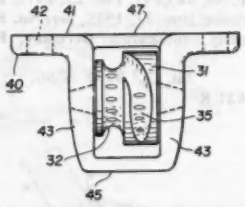
LOCKING PULLEY ASSEMBLY AND METHOD OF MAKING SAME

Ruediger Einhorn, Katonah; Lee Richard Chasen, Port Chester, and Karl Hannes, White Plains, all of N.Y., assignors to Coats & Clark, Inc., Stamford, Conn.

Division of Ser. No. 550,162, Feb. 14, 1975, Pat. No. 3,944,186. This application Nov. 10, 1975, Ser. No. 630,717

Int. Cl.² B21K *1/42*

U.S. Cl. 29—159 R **3 Claims**



1. A method for forming an article having a freely rotatable element comprising die casting a first element with frustoconical bearing surfaces on opposite ends thereof, die casting a second element with a pair of opposed outwardly bowed portions joined by spaced apart bridging portions having frustoconical bearing surfaces on facing sides, whereby one of said first and second elements is cast prior to the other with the frustoconical bearing surfaces of said one element forming the bearing part of the die for the casting of the other element, then inwardly compressing said bowed portions of said second element to thereby urge said bridging portions apart for freeing the rotational joints between said first and second elements defined by said bearing surfaces.

4,007,533

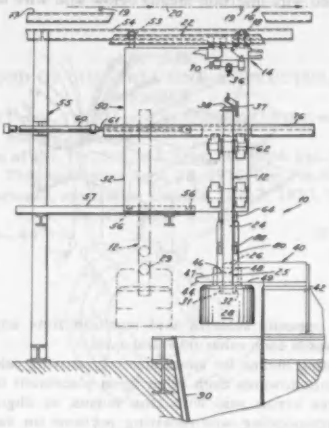
APPARATUS FOR STRIPPING AN ANODE BLOCK FROM AN ANODE ASSEMBLY

Ross H. Brandon, Detroit, and Peter P. Zeffer, Harper Woods, both of Mich., assignors to Jervis B. Webb Company, Detroit, Mich.

Filed Nov. 24, 1975, Ser. No. 634,840

Int. Cl.² B23P *19/04*

U.S. Cl. 29—762 **15 Claims**



1. Apparatus for stripping an anode block from an anode assembly which consists of said anode block, a yoke attached thereto, and a rod having one end secured to the yoke, said apparatus comprising:

an anode assembly conveyor including a carrier track, a carrier supported thereon, and means for propelling the carrier along the carrier track;

suspension means attaching the other end of the rod of the anode assembly to the carrier;

a stripping station located along the path of carrier travel on the carrier track;

said stripping station including a fixedly mounted anvil located below the carrier track and having supporting means for engaging the yoke of the anode assembly, transfer means for transferring the support of the anode assembly from the conveyor carrier to said supporting means, stripping means mounted adjacent to the anvil for movement relative thereto, and means for moving the stripping means into engagement with the anode block of the anode assembly supported by said supporting means to strip the anode block from the yoke.

4,007,534

MULTI-CONDUCTOR HALF TAP

John James Tucci, Winston-Salem, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jan. 14, 1976, Ser. No. 649,010

Int. Cl.² H01R *43/04*

U.S. Cl. 29—566.3 **6 Claims**

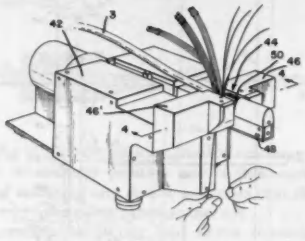
1. An apparatus for simultaneously inserting a pair of wires into the oppositely facing wire-receiving portions of corresponding terminals in each of two similar adjacent multi-contact electrical connectors, a top connector and a bottom connector each connector having a mating side and a rearward side with a plurality of terminals extending from said mating side to said rearward side, said wire-receiving portions on terminals in each connector being in two parallel rows along said rearward side, said connectors being positioned with said rearward sides adjacent and all of said rows parallel, said apparatus comprising:

an insertion zone,

connector holding means for positioning the wire-receiving portions of corresponding terminals in said insertion zone with said rearward sides of said two connectors in said insertion zone and said mating sides above and below said insertion zone,

wire stop means on each side of said zone, said wire stop means extending transversely of, and adjacent to, said rows and generally between said mating side and said wire receiving portions in said top connector,

opposed wire-insertion means below said wire stop means



on opposite sides of said insertion zone and movable towards each other into said zone,

actuating means for simultaneously moving said insertion means towards each other upon placement of a pair of wires across said wire stop means, in alignment with corresponding wire-receiving portions on each side of said connectors, and parallel to the axis of said terminals, whereby

a multi-conductor tap can be formed by simultaneously attaching wires to corresponding terminals in two oppositely facing multi-contact electrical connectors.

4,007,535

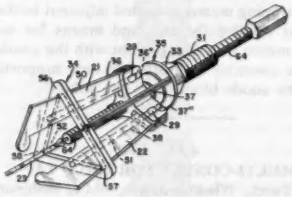
LOCKING PULLER DEVICE

Paul W. Brandt, and Dean S. Somerville, both of McHenry, N. Dak.

Continuation-in-part of Ser. No. 550,978, Feb. 19, 1975, abandoned. This application Sept. 4, 1975, Ser. No. 610,412

Int. Cl.² B23P *19/04*

U.S. Cl. 29—261 **1 Claim**



1. A locking puller device for pulling an object such as an inner race of a bearing off of a shaft, said device having three tapered jaws, a collar having mounting means at spaced intervals about the collar, said jaws projecting forward and having their rearward ends pivotally mounted to said mounting means of said collar, a cam ring framework comprising a cam ring laterally surrounding said jaws at a location spaced forward of the pivotal mounting of the collar, said collar having a sleeve fixed thereto and projecting rearward from the collar, a single threaded nut means threaded onto said sleeve, said cam ring framework also including a rear collar mounted to said single threaded nut means by an annular rotatable tongue and groove connection, said framework including braces fixed between the cam ring and the rear collar to place the cam ring and rear collar in fixed relation to one another whereby rotation of the single threaded nut means in one direction moves the threaded nut forward, and through the tongue and groove connection within the rear collar, the nut means also acts to push the rear collar forward, the bracing the cam ring forward in fixed relation to one another pushes the framework forward in a straight line nonrotating manner to cause the cam ring to move forward and engage against the jaws and pivot the forward ends of the jaws radially into engagement about the object and cause the jaws in turn to lock about the object, and rotation of the single threaded nut means rearward through the tongue and groove connection applies a rearward force to the rear collar to push the rear collar, braces, and cam ring rearward in fixed relation to one another in a straight line nonrotating manner to disengage the cam ring from the jaws to free the jaws from their locking engagement about the object, a rod threaded into the sleeve to be turned forward against the shaft, while the cam ring is locked about the jaws, the jaws are locked about the object on the shaft to apply a forward force against the shaft, with the reaction causing the jaws to pull the object rearward off the shaft, a plurality of spring means mounted on said collar adjacent the pivotal mountings having their one ends connected to the collar and their other ends connected to the jaws to simultaneously and continuously bias said jaws outward against the inside edges of the cam ring and cooperate with the cam ring, said jaws when locked about an object of appropriate size, having its outer surfaces tapered to diverge forward and outward gradually along a relatively straight line, said cam ring having an inside diameter less than the outside diameter of the jaws along the forward portions of the jaws and having an inside diameter less than the outside diameter of the jaws along the rearward portions of the jaws, whereby movement of the cam ring forward causes gradual engagement with the jaws causing the jaws to be gradually cammed toward one another, by the cam ring overcoming the action of the springs to the extent to cause the jaws to converge toward one another at a rate as allowed by the cam ring to thereby cause said jaws to be automatically engaged about the object before pulling the object off the shaft, and rearward movement of the cam ring enables the jaws to expand radially outward under the biasing of the springs at a rate as allowed by the cam ring, thereby automatically disengaging and freeing the jaws from the object after pulling the object off the shaft.

4,007,536

METHOD OF USING A SEALING STRIP TO MOUNT A GLASS PANEL IN A SHEET METAL BODY

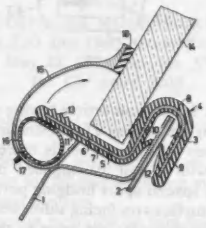
Gosta Soderberg, Karl Johansgatan 47 H, Goteborg, Sweden

Division of Ser. No. 445,091, Feb. 25, 1974, abandoned. This application June 27, 1975, Ser. No. 591,018

Claims priority, application Germany, Feb. 28, 1973, 2309921

Int. Cl.² B23P *17/00*

U.S. Cl. 29—421 R **3 Claims**



1. A method of installing a glass panel in a window opening extending through a body of sheet metal in a predetermined direction, said body having an edge portion bounding said opening, said method comprising:

a. placing a laminar, elongated sealing strip on said body,

1. said sealing strip including a core layer of sheet metal having two longitudinal edges and two opposite major faces connecting said edges, and first and second surface layers of elastomeric material respectively superimposed on said major faces and projecting laterally beyond said edges, the projecting portions of said first and second layers being integrally connected, whereby said core layer is enveloped by said elastomeric material, said strip and each of said layers thereof being of uniform, hook-shaped cross section over the length thereof and constituting an approximately U-shaped channel portion and a plate portion angularly joined to said channel portion,
2. said sealing strip being placed on said body in a position in which said edge portion is received in said channel portion, and said plate portion projects from said channel portion in said direction;

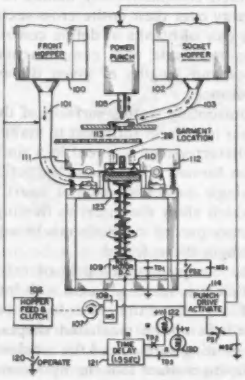
b. moving said panel in said direction along said plate portion until said panel abuts against said channel portion and a part of said panel portion projects away from said channel portion beyond said panel; and

c. folding the projecting part of said plate portion inward of said opening on said panel.

4,007,537
METHOD OF REGISTERING LOGO CARRYING FASTENER PRIOR TO EMPLACEMENT ON GARMENT

Herbert M. Silverbush, Providence, R.I., and Philip B. Jensen, Seekonk, Mass., assignors to Rau Fastener, a division of U.S. Industries, Inc., Providence, R.I.

Division of Ser. No. 529,689, Dec. 5, 1974, abandoned. This application Aug. 20, 1975, Ser. No. 606,076
Int. Cl.² B23P *11/00*
U.S. Cl. 29—432.1 **9 Claims**



1. A method of registering a fastener containing a given logo on a surface prior to the emplacement of the same on a garment, said fastener including indicator means located on a surface thereof indicative of the orientation of said logo with respect to any one of a desired number of preferred orientations, comprising the steps of:

a. placing said fastener on a rotatable emplacement table in any one of a plurality of arbitrary positions,

b. rotating said table at a relatively high speed to cause said fastener to rotate solely about its axis,

c. selecting any one of a plurality of projections located about the rotational path, each adapted to coact with said indicator means, to restrain said fastener in a desired position determined by said selected projection,

d. coacting said indicator means with said projection when said fastener is at said desired position during rotation of the same,

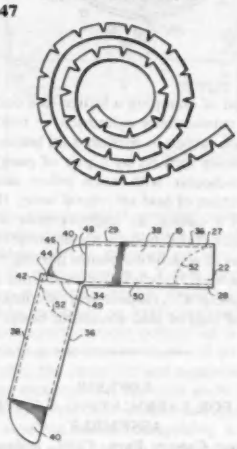
e. ceasing rotation of said fastener when said indicator means is coacted,

f. emplacing said fastener on said garment when said rotation is ceased and therefore when said indicator means is coacted.

4,007,538
METHOD OF CONSTRUCTING A STRUCTURAL MEMBER

John David Petrie, 1112 ManuLife House, 603-7th Ave., S.W., Calgary, Alberta, Canada

Division of Ser. No. 510,863, Sept. 30, 1974, Pat. No. 3,925,943. This application Sept. 18, 1975, Ser. No. 614,602
Claims priority, application Canada, Oct. 2, 1973, 182482
Int. Cl.² B23P *11/02*
U.S. Cl. 29—447 **12 Claims**



1. A method of constructing a structural member capable of being coiled by bending said member in one direction and being uncoiled by bending said member in the opposite direction to form a frame member, said method comprising forming an elongated one-piece body member of suitably flexible material by extrusion of said material, embedding suitably high strength, flexible members in one side of said body member during said extrusion, said flexible members extending longitudinally in said body member, and cutting said body member transversely at a number of locations along the length thereof, each cut formed thereby extending inwardly from the side of the body member opposite said one side and having a bottom near but spaced apart from said one side of the body member, whereby a relatively thin, flexible joint at said one side is formed by each cut and has said flexible members extending therethrough.

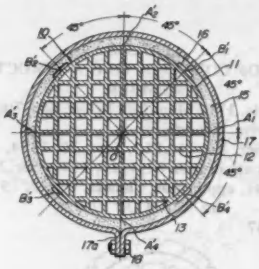
2. A method of constructing a structural member according to claim 1 including forming a passageway extending lengthwise through said body member during extrusion thereof, inserting sheer members of suitably strong material in said passageway, arranging said sheer members in said passageway whereby each sheer member traverses a respective cut formed by said cutting of said body member when said structural member is uncoiled and absorbs sheer forces in said structural member at its respective cut, and securing said sheer members to prevent longitudinal movement of said sheer members in said passageway.

4,007,539

METHOD OF CLAMPING A LATTICE-LIKE CERAMIC STRUCTURE BODY

Shinji Nishio, Komaki, Japan, assignor to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Apr. 7, 1976, Ser. No. 674,488
Claims priority, application Japan, Apr. 11, 1975, 50-44567
Int. Cl.² B21D *39/00*; B23P *19/04*
U.S. Cl. 29—455 R **6 Claims**



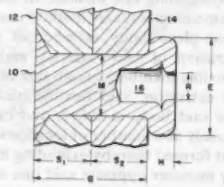
1. In a method of clamping a lattice-like ceramic structural body, which is substantially cylindrical in contour and a substantially uniform lattice in section, said lattice having a number of square holes formed by a pair of parallel wall groups crossing perpendicular with each other and extending in lengthwise direction of said structural body, through a damping member by a casing, an improvement which comprises clamping said structural body without subjecting a clamping force to portions at which two planes passing through a center line of said structural body and inclined from said wall groups by an angle of about 45°, respectively, are intersected with the outer peripheral wall of said structural body.

4,007,540

METHOD FOR FABRICATING A CAVITY RIVET ASSEMBLY

Gerald W. Tyree, Canoga Park, Calif., assignor to Lockheed Aircraft Corporation, Burbank, Calif.

Division of Ser. No. 399,311, Sept. 21, 1973, abandoned. This application Mar. 3, 1975, Ser. No. 555,074
Int. Cl.² B21D *39/00*; B23P *11/00*
U.S. Cl. 29—509 **2 Claims**



1. The method of joining a plurality of parallel, abutting structural members, comprising the steps of:

forming axially aligned holes through such members;

inserting through said holes a rivet having a shank with a head on one end and a cavity is an opposite end until said head firmly contacts one of such members, the bottom of said cavity terminating intermediate of the thickness of the structural member nearest the cavity-containing rivet end;

applying a deforming force to said cavity-containing rivet end so as to deform said rivet in the region intermediate the bottom and the end of said cavity doubling it upon itself and increasing its diameter to a size greater than the diameter of said holes to obtain a firm contact with an external surface of the adjacent structural member, the diameter of said cavity at its end after such deformation being smaller than the diameter of said holes, thereby securing together the structural members.

4,007,541

METHOD FOR FABRICATING A DIELECTRIC FILLED FERRITE TOROID FOR USE IN MICROWAVE DEVICES

Frank R. Monforte, Los Altos, and Giltan M. Argentina, San Jose, both of Calif., assignors to Ampex Corporation, Redwood City, Calif.

Filed Apr. 14, 1975, Ser. No. 567,757
Int. Cl.² H01P *11/00*; H01F *41/02*
U.S. Cl. 29—600 **7 Claims**

PRESS TWO BLANKS OF FERRITE TO SHAPE SELECTED
MACHINE BLANKS TO DIMENSIONS
LAP MATING SURFACES TO SELECTED FINISH
MACHINE DIELECTRIC INSERT TO DIMENSIONS
ASSEMBLE FERRITE AND DIELECTRIC INSERT INTO UNIT

1. A method for fabricating a two-piece toroid having a dielectric material insert, which two-piece toroid exhibits the hysteresis loop characteristics of a one-piece toroid, comprising the steps of:

pressing selected quantities of a magnetic material into a pair of selected complementary blanks of substantially uniform density over their entire cross-sections;

machining the pair of blanks to define confronting mating surfaces commensurate with complementary cross-sectional shapes and lengths of given dimensions within selected tolerances;

lapping the confronting mating surfaces of the pair of machined shapes to a finish sufficient to maintain the hysteresis loop characteristics inherent in a similar one-piece configuration formed of the same magnetic material;

machining a single dielectric material insert to outside dimensions which allow the insert to fit snugly within the complementary pair of magnetic machined shapes along the entire length thereof; and

assembling the complementary pair of machined shapes about the dielectric material insert with intimate contact between all surfaces of the insert facing respective confronting surfaces of the machined shapes, wherein the lapped confronting surfaces of the machined shapes are in such intimate contact that the hysteresis loop characteristics are similar to those of a one-piece toroid.

4,007,542

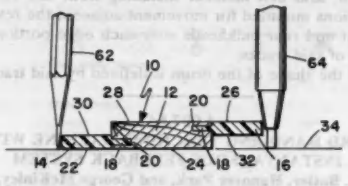
STRAIGHTEDGE

Fred R. Bergendorff, 7429 Orien, La Mesa, Calif. 92041

Continuation-in-part of Ser. No. 512,470, Oct. 7, 1974, abandoned, which is a continuation-in-part of Ser. No. 397,603, Sept. 14, 1973, abandoned. This application July 3, 1975, Ser. No. 593,170
Int. Cl.² B43L *13/14*
U.S. Cl. 33—77 **1 Claim**

1. A two level perspective straightedge, comprising: an elongated, substantially flat rigid spine having opposed faces and edges; longitudinally extending transparent edge members fixed to opposite edges of said spine, the edge members being offset in opposite directions with one face of one edge member flush with a first face of the spine and the other face of said

one edge member inset from the second face of the spine, one face of the other edge member flush with said second face of the spine and the other face of said other edge member inset from said first face of the spine; and each of said edge members having graduated markings on the inset faces thereof in



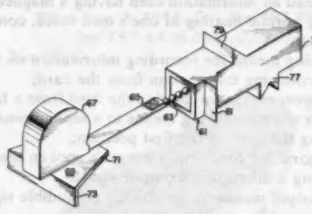
increments which diminish in spacing from one end to the other in perspective proportion and wherein the direction of diminishing spacing of the markings on one of said edge members is in the opposite direction from the direction of diminishing spacing of the markings on the other of said edge members.

4,007,543

MULTIPLE GAUGING DEVICE FOR MODIFIED SHIP-LAP CORNER SEAMS

Alexander W. McClay, Jr., 29 W. Bank St., Petersburg, Va. 23803

Continuation of Ser. No. 486,654, July 2, 1974, abandoned, which is a continuation of Ser. No. 178,696, Sept. 8, 1971, abandoned. This application Nov. 12, 1975, Ser. No. 631,037
The portion of the term of this patent subsequent to July 23, 1991, has been disclaimed.
Int. Cl.² G01B 3/10
U.S. Cl. 33—137 R **13 Claims**



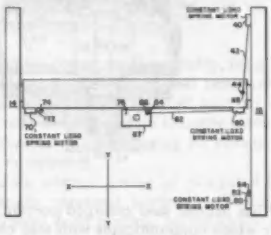
1. A gauging means including a linear measurer for use in a dimensioning procedure to set the position of a guide-edge for cutting tools prior to making single vertical cuts, and modified ship-lap groove cuts containing a rabbeted edge along one side and a vertical butt edge along the other side, in insulating board of appreciable thickness, in order that a corner may be formed therealong for the subsequent fabrication of structures specified as to inside dimensions including ducts, duct fittings, conduits, and box-like structures; said gauging means comprising a multi-sided body, and linear measurer, and rotatable means of attachment, one to the other to permit rotation of the body relative to the measurer, a plurality of appendages extending from the body and each having at least one alignment face to engage edges of, or cuts in, the board; at least one of said appendages having both a leading and a trailing face with a third means of alignment centered therebetween; said one appendage extending outwardly of said body for a distance no greater than the rabbet depth of said rabbeted edge; said one appendage having a length longitudinally of the body equal to twice the distance between the vertical face and the adjacent rabbeted edge of the modified ship-lap groove; either of said leading and trailing gauging faces, when adjacent the vertical butt edge of a groove cut, sets the position of the body and the attached linear measurer in that longitudinal location along a line of measurement which will allow the linear measurer to indicate the position of the guide-edge for the subsequent groove cut in terms of the specified inside dimension of that side of the structure lying between the aforesaid groove cut and the aforesaid subsequent groove cut whether or not the butt edge face of the aforesaid groove cut faces in a direction toward, or oppositely from, the aforesaid subsequent groove cut.

4,007,544

CONSTANT LOAD PROBE SYSTEM FOR COORDINATE MEASUREMENT MACHINES

William E. Kirby, and Robert Duncan, both of Columbia, S.C., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 30, 1974, Ser. No. 519,326
Int. Cl.² G01B 3/00
U.S. Cl. 33—174 R **2 Claims**



1. A coordinate measurement machine comprising a base having spaced upstanding bridge arms, a housing mounted on each of said bridge arms, a carriage on said spaced bridge arms supported for movement in a Y-axis direction, a probe translator having a sensing probe projecting downwardly therefrom slidably mounted on said carriage in the X-axis direction, and a readout console connected with said probe for visually displaying the measurement of part coordinates made by said probe, the improvement comprising:

separate means mounted on opposite ends of one of said arms and on opposite ends of said carriage,

each of said separate means comprising a spring motor having a flexible cable therein designed to exert a constant load of uniform force on an object;

a stationary device mounted on one end of the carriage which is closest to said arm carrying the flexible cables, so that when the flexible cables on the arms are separately attached to the stationary device on the carriage, the probe will be urged in either a + or − Y axis direction;

a pair of stationary devices mounted on opposite ends of the probe translator so that when the flexible cables on the carriage are separately connected to the stationary devices on the probe translator, the probe will be urged in either a + or − X axis direction;

whereby upon placing the probe against a part to be measured, and appropriately connecting flexible cables respectively to the carriage and probe translator, the probe will be urged with a uniform force simultaneously in the X and Y axis directions against the part when the probe is positioned to sense part coordinates in any one of four quadrants.

4,007,545

METHOD FOR ADJUSTING TEMPERATURE AND PRESSURE OF A FLUID

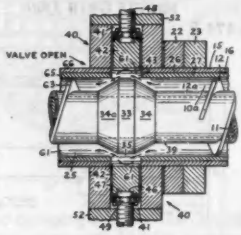
George Oliver Briggs, West Lake, Ohio, assignor to International Basic Economy Corporation, New York, N.Y.

Filed Jan. 14, 1972, Ser. No. 217,744
Int. Cl.² F26B 5/14, 7/00
U.S. Cl. 34—14 **4 Claims**

1. A method for adjusting the upstream pressure or temperature of a moist polymeric material flowing through a conduit,

or the flow rate of said material, said material being under sufficient pressure to prevent the moisture from vaporizing at the temperature of the material, which comprises:

1. passing the material through a channel defined by an inner wall of the conduit and an obstruction having a substantially smooth outer surface located within the conduit, said channel having a cross-sectional area less than that of said conduit and an upstream and downstream end, the upstream end communicating with said pressurized polymeric material;
2. enlarging the cross-sectional area of at least a portion of said channel radially outward to provide an enlarged portion thereof to which material flowing through said



channel has access, said enlarged portion comprising a chamber which communicates with said channel;

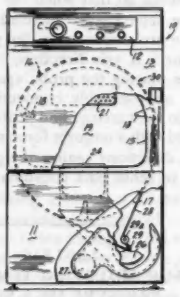
3. adjusting the resistance to the flow of material through the conduit by adjusting the volume of said chamber;
4. conducting the material emanating from the downstream end of said channel into a zone wherein the pressure is sufficiently low to permit substantially all the moisture associated with the material to immediately vaporize and immediately expand the material to the full extent required for said vaporization thereby drying the material; and
5. compacting the dried material under pressures sufficiently low to prevent condensation of the vapor released from the material back onto the material.

4,007,546

CLOTHES DRYER WITH FLEXIBLE DRUM

Leo H. Sauer, St. Joseph, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Aug. 6, 1975, Ser. No. 602,235
Int. Cl.² F26B 11/02
U.S. Cl. 34—133 **18 Claims**



1. A clothes drying appliance having a cabinet including front and rear wall portions, a drum mounted within the cabinet for tumbling clothes, drive means for rotatably driving the drum, and means for circulating heated air through the interior of the drum to facilitate drying of the clothes therein; said drum comprising:

a front and a rear bulkhead formed respectively adjacent said front and rear cabinet wall portions, each said bulkhead having surfaces defining corresponding annular tracks thereon; and

an endless flexible belt member forming a sidewall of the drum, said belt member including front and rear edge portions mounted for movement adjacent the respective front and rear bulkheads with each edge portion riding one of said tracks,

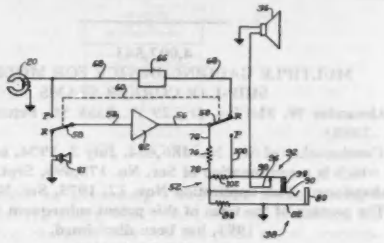
whereby the shape of the drum is defined by said tracks.

4,007,547

CARD HANDLING TEACHING MACHINE WITH INSTANTANEOUS FEEDBACK SYSTEM

Glenn A. Butler, Hanover Park, and George McKinley, Northbrook, both of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Filed Jan. 9, 1975, Ser. No. 539,773
Int. Cl.² G09B 19/04
U.S. Cl. 35—35 C **11 Claims**



1. An improvement in a card reading type teaching machine adapted to read an information card having a magnetic stripe for providing normal hearing of one's own voice, comprising, in combination:

a transducing means for recording information on the card and reproducing information from the card;

card transport means for moving the card from a first position past the transducing means to a second position and returning the card to the first position;

a microphone for receiving a person's spoken sounds and producing a microphone output signal;

a sound output means for producing an audible signal;

an amplifier;

switch means movable between a record mode and a playback mode for alternately connecting said amplifier to said microphone and transducing means when in a record mode, for recording the microphone output signal on the magnetic stripe and for connecting the transducing means and amplifier with the sound output means when in the playback mode for audibly reproducing a recorded signal from the magnetic stripe; and

an instantaneous feedback means connecting said amplifier with said sound output means by a non-frequency responsive attenuated path whereby the information being recorded is simultaneously transmitted to the sound output means to permit the user to simultaneously hear an undistorted reproduction.

4,007,548

METHOD OF TEACHING READING

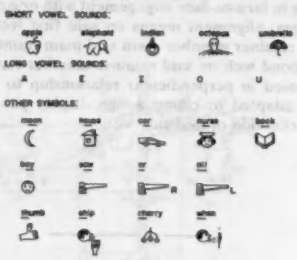
Kathryn Frances Cytanovich, 230 California Ave., Suite 109, Palo Alto, Calif. 94306

Filed Jan. 31, 1975, Ser. No. 546,029
Int. Cl.² G09B 17/00
U.S. Cl. 35—35 R **13 Claims**

1. In a method of teaching reading, the steps of

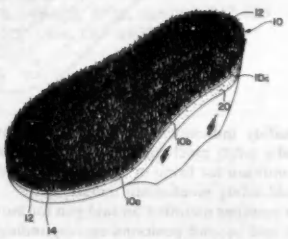
1. presenting the student with material to be read in an orthography consisting of:

a. the words to be read in standard type;
b. symbols representing the sounds of vowel phonemes and consonant digraphs appearing in the material proximately located to the phonemes and digraphs to assist in pronouncing the sounds,



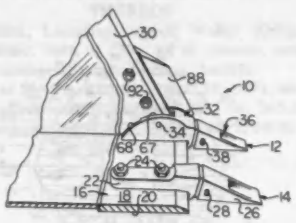
c. markings to designate combined letters forming a single sound, and
d. numerical designations in directional sequence of each sound in each word, and
2. sequencing the sounds of each syllable in the direction of increasing numbers.

4,007,549
SOLE FOR ATHLETIC SHOE
Robert J. Moore, 3533 Ridgewood Drive, Pittsburgh, Pa. 15235
Filed June 3, 1975, Ser. No. 583,300
Int. Cl.² A43B *5/00, 23/28*
U.S. Cl. 36—59 C **7 Claims**



1. In an athletic shoe having uppers and an inner sole to which said uppers are joined, an improved traction sole for use on playing fields selectively of natural turf and artificial turf, each said turf defining a surface of said playing field comprising upwardly protruding, randomly oriented, fiber-like elements, comprising:
synthetic turf material of a configuration corresponding to a desired traction sole configuration and having a flexible backing layer and plural resilient fiber-like elements extending substantially individually from one surface of said backing layer in random orientations and of a sufficient length to project individually into and interengage with the randomly oriented fiber-like elements of said turf of said playing field surface for providing improved traction therewith in all directions of movement of the sole on the said playing field turf surface, and
a layer of adhesive material intermediate said synthetic turf traction sole and said inner sole for securing the traction sole to said inner sole.

4,007,550
REPLACEABLE CORNER TOOTH ASSEMBLY
Visvaldis A. Stepe, Willow Springs, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.
Filed May 19, 1975, Ser. No. 578,579
Int. Cl.² E02F *9/28*
U.S. Cl. 37—141 T **4 Claims**

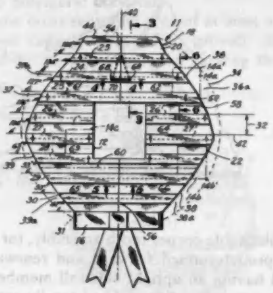


1. A replaceable corner tooth assembly, for a loader bucket having a predetermined forward and rearward direction of travel and having an upright sidewall member and a leading cutting edge member disposed in laterally extending horizontal relation therefrom and defining an effectively workable corner edge, comprising;
a corner tooth adapter having an elongated body of three longitudinally arranged sections including a centrally disposed solid body portion, an integrally forwardly extending nose portion, and an integrally rearwardly extending gripping portion with a strong inwardly facing L-shaped angle member including a sidewall having a convexly shaped upper surface and a thick base for extended service life and with an inner leg of rugged upright rectangular cross section having a convexly shaped upper surface coextending deeply rearwardly therefrom which define between them a rearwardly L-shaped cavity that interlockingly closely receives the sidewall member and the leading cutting edge member protectingly at the intersection thereof whereupon said angle member embraces the outside of the corner edge and said inner leg lies in load bearing engagement substantially for its full length within the corner edge;
a replaceable wear tip removably mounted on said nose portion of said adapter; and
retaining means intermediate said corner tooth adapter and the loader bucket, and intermediate said replaceable wear tip and said nose portion to permit quick release thereof for servicing purposes and to allow working operation of the bucket corner edge without said adapter and said tip.

4,007,551
ORNAMENTAL GREETING CARD DISPLAY
Frank J. Vernon, 131 Central Ave., Bogota, N.J. 07603
Filed June 27, 1975, Ser. No. 591,082
Int. Cl.² G09F *1/10*
U.S. Cl. 40—124.2 **8 Claims**

1. A display device for mounting greeting cards each having a dimension at least equal to a predetermined value, comprising a generally annularly or wreath-shaped support member having a substantially flat surface and outer and inner peripheral edges bounding said surface; a plurality of elongate substantially parallel mounting strips spaced along one planar direction of said surface said strips being oriented in horizontal directions when the device is mounted for use, the spacing between adjacent strips being equal to the predetermined value, each of said strips being connected on said support member at only one elongate edge thereof to form an opening in the nature of a card-receiving pocket between the other elongate edge of the respective strip and said support member, the openings of all said strips facing the same direction along

said planar direction, said strips having the opposing ends thereof each extending to at least one of said peripheral edges, and being at least partially open at the end edges thereof to permit greeting cards to be received within the respective pockets and to extend beyond the ends of said strips and said peripheral edges, whereby insertion of greeting cards in overlapping relation into all said pockets formed by said strips along the entire lengths and beyond the ends thereof so as to



project beyond said peripheral edges covers said support member and said strips above the lowermost strip; and decorative covering means mounted on said support member for covering the lowermost strip and that part of said support member not covered by the greeting cards, whereby said support member and all said strips are totally hidden from view and said display device is covered with an array of greeting cards which generally assumes the shape of said support member.

4,007,552

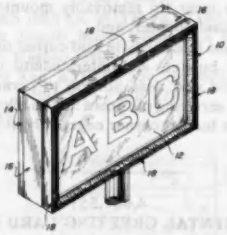
EXTRUDED ALUMINUM SIGN FRAME SYSTEM

Jackson R. Brooks, Fort Collins, Colo., assignor to ABC Extrusion Company, Fort Collins, Colo.

Filed Sept. 4, 1973, Ser. No. 393,927

Int. Cl.² G09F 7/18

U.S. Cl. 40—130 R **19 Claims**



1. A sign frame assembly for constructing a hollow peripheral frame that supports a sign display panel comprising:

an extruded main frame member having a generally flat main panel;

a pair of opposed side webs integral with said main panel and extending along the opposite side edges thereof;

cover support flanges, integral with each of said side webs, extending along the edge of each side web remote from said main panel and projecting from the respective side webs into spaced overlying parallel relationship with said main panel;

a generally flat cover member adapted to span the space between said support flanges;

longitudinally extending rib means on said cover member projecting from the interior side of said cover member along the opposite side edges thereof;

said support flanges of said main frame member having longitudinally extending rib receiving recesses therein located to receive said ribs to releasably clamp said cover member to said main frame member and cooperatively define a closed hollow tubular structure;

and an extruded retainer member having a first web adapted to lie in face-to-face engagement with one of said support flanges, alignment means on said first web for locating said retainer member upon said main frame member and a second web on said retainer member having a portion disposed in perpendicular relationship to said first web and adapted to clamp a sign display panel against the exterior side of said side web.

4,007,553

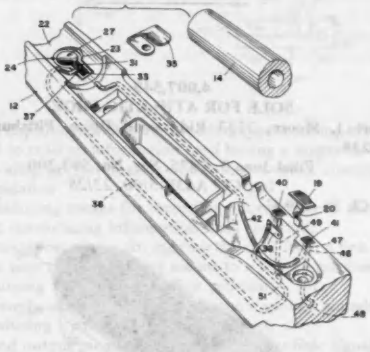
SAFETY INDICATORS FOR GUNS

Kessler Q. Clegg, 904 Perkinswood SE., Warren, Ohio 44484

Filed Aug. 4, 1975, Ser. No. 601,380

Int. Cl.² F41C 17/00, 11/04

U.S. Cl. 42—1 A **4 Claims**



1. A safety indicator device for a gun having a barrel, a stock and a safety mechanism for selectively setting the gun in a first condition for firing or in a second condition to prevent firing, said safety mechanism including

a slide member mounted on said gun for movement between first and second positions corresponding respectively to said first and second conditions,

said indicator device comprising a first jewel mounted on said gun adjacent said slide member and exposed by said slide member in said first position and covered thereby in said second position,

a battery, light bulb and electrical circuit therebetween mounted in said gun, and including switch means cooperatively associated with said slide member for closing said circuit to energize said bulb when said slide member is in said first position, and opening said circuit in said second position,

a first light-transmitting conduit means mounted on said gun extending between said light bulb and said jewel thereby to internally illuminate said jewel when said slide member is in said first position, and,

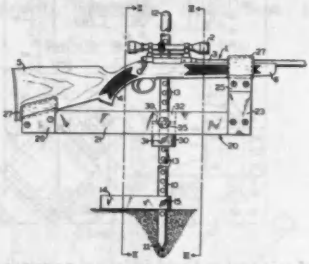
second light-transmitting conduit means mounted in said gun to extend from said jewel to a point on the exterior thereof thereby to pick up ambient light to illuminate said jewel in the event of electrical failure with concomitant absence of positive light bulb illumination.

4,007,554

ADJUSTABLE GUN SUPPORT

Glenn D. Helmstadter, 381 Niagara Drive, North Huntingdon, Pa. 15642

Filed May 5, 1975, Ser. No. 574,350
Int. Cl.² F41C *29/00*
U.S. Cl. 42—94 10 Claims



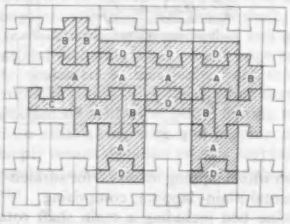
1. An adjustable gun support comprising, an elongated unipod having one end pointed for ground affixation, said elongated unipod member accommodating a step-on member for depressing said pointed end of said elongated unipod member into the ground, a two-point contact cradle member cooperatively associated with said elongated unipod member for steadily holding a gun in place, means for allowing said cradle member to be adjusted to various positions along the length of said elongated unipod member and spring-loaded means for allowing the gun to be unaidedly carried by said cradle member yet to be facilely rotated and pivoted for sighting-in on a target.

4,007,555

COMBINATION OF BLOCK UNITS

Nobuhiko Sasaoka, Tokyo, Japan, assignor to Okamura Co., Ltd., Tokyo, Japan

Filed Jan. 8, 1976, Ser. No. 647,623
Int. Cl.² A63H *33/08*
U.S. Cl. 46—25 6 Claims



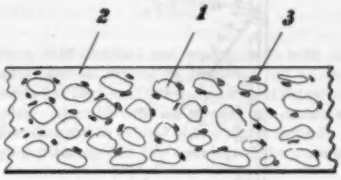
1. A combination of block units comprising:
a generally H-shaped block unit having a configuration including two symmetrical grooves extending in Y-axis direction in a basic rectangular parallel-piped having X-, Y- and Z-axes intersecting with the right angle with each other, each of said grooves has a base wall which is parallel with X-axis and oppositely inclining side walls intersecting with the base wall with an acute angle, the distance between the centerlines extending in Y-axis direction on the side walls being half of the length of said parallel-piped in the X-axis direction,
a generally T-shaped block unit having a configuration attained by bisecting the H-shaped block unit along the X- and Z-axes thereof,
a generally U-shaped block unit having a configuration attained by bisecting the H-shaped block unit along the X- and Y-axes thereof, and
a generally T-shaped block unit having a configuration complementary to the U-shaped block unit.

4,007,556

FOAM BODY AND PROCESS FOR THE PRODUCTION THEREOF

Maternus Glück, Leonding-Doppel; Walter Kriegner, and Bernhard Eder, both of Linz, all of Austria, assignors to Semperit Aktiengesellschaft, Vienna, Austria

Continuation of Ser. No. 184,406, Sept. 28, 1971, abandoned. This application May 14, 1973, Ser. No. 360,321
Claims priority, application Austria, Oct. 1, 1970, 8859/70
Int. Cl.² A01C *1/04*
U.S. Cl. 47—56 1 Claim



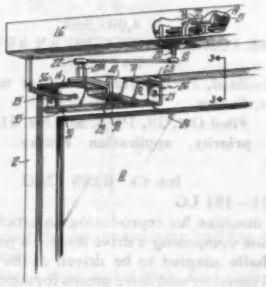
1. Process for the manufacture of a seed growing body characterized in that a foamed binding agent is added to a mixture of polyurethane foam-pieces and seeds whereupon the resulting mixture is moulded.

4,007,557

PIVOT HUNG POWER OPERATED DOOR AND INERTIA INSENSITIVE DISCONNECTABLE DRIVE LINKAGE THEREFOR

William R. Davis, West Simsbury, and William H. Flaherty, Jr., Bristol, both of Conn., assignors to The Stanley Works, New Britain, Conn.

Filed Mar. 3, 1975, Ser. No. 554,632
Int. Cl.² E05F *15/54*
U.S. Cl. 49—139 6 Claims



1. A power operated pivot hung door suited for bi-swinging movement, a power operator for powering the door through a door opening and closing cycle in one direction from the door closed position, and an inertia insensitive disconnectable drive linkage for connecting the operator to the door, said drive linkage comprising a door bracket fixed to the door and an operator arm pivotally mounted thereto, said operator arm providing a drive arm offset from the pivot axis of the door, means operatively connecting said drive arm to said power operator, a latch for positively locking said operator arm to

said bracket during the normal powered operation of the door regardless of the forces imposed thereon, and latch release means automatically operable to release said operator arm for pivotal movement relative to said bracket only when the door is swung beyond said door closed position in the direction opposite to said one direction for emergency operation.

4,007,558

TURNABLE WINDOW ARRANGEMENTS

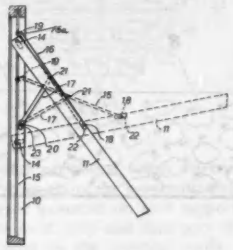
Bernhard Heggdal, deceased, late of Haramsoy, Norway (by Helene Heggdal, legal representative), assignor to Leif N. Austines, Haramsoy, Norway

Filed Jan. 29, 1976, Ser. No. 653,396

Claims priority, application Norway, Apr. 30, 1975, 751542

Int. Cl.² E05D *15/44*

U.S. Cl. 49—252 **5 Claims**



1. A turnable window arrangement which comprises a window frame having a guide groove extending along each of two opposing sides between upper and lower ends thereof, a casement having a pair of oppositely directed pivot pins at an end thereof which is uppermost when said casement is in a normal closed position relative to said frame, said pivot pins being displaceable in said casement in a direction substantially parallel to the height dimension of said casement and slidably engaging said guide grooves to permit said end of said casement to be displaced to selected pivotal positions between said upper and lower frame ends, said pivot pins being displaceable in said casement from the uppermost end thereof towards its opposite end against resilient means, and a link arm mechanism arranged on opposite sides of said casement to support the latter in said frame at said pivotal positions.

4,007,559

MACHINE FOR REPRODUCING AN ARTICLE FROM A PATTERN

Dzidris Guillard, Paris, France, assignor to Societe C.M.V., Puteaux, France

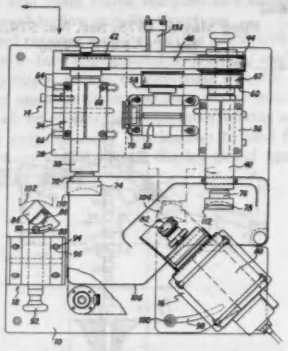
Filed Oct. 29, 1974, Ser. No. 518,957

Claims priority, application France, Oct. 26, 1973, 73.38221

Int. Cl.² B24B *17/02*

U.S. Cl. 51—101 LG **3 Claims**

3. In a machine for reproducing an article from a pattern, the machine comprising a drive means, a pair of parallel supporting shafts adapted to be driven at the same continuous rotational speed by said drive means for supporting said article and said pattern respectively, a tool and a feeler for contacting said article and said pattern respectively and arranged in a constant spacial relationship equal to the interval between said article and said pattern, the improvement comprising said tool and said feeler being fixed and a table on which said supporting shafts are mounted, said table being capable of making an advance movement in a direction perpendicular to said supporting shafts and a contact movement in a direction parallel to said supporting shafts, said machine further including a motor, wherein said tool and said feeler are in the form of discs of the same diameter rotatable about parallel, fixed axes of rotation, said tool being driven by said motor and said feeler rotating freely about its axis, and wherein the axes of



rotation of said tool and said feeler are perpendicular to said supporting shafts.

4,007,560

TWO WHEEL LAPPING MACHINE

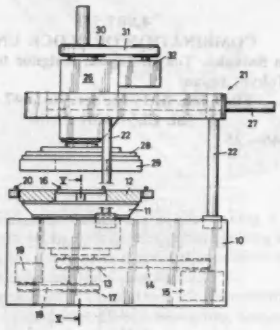
Jos M. Janssen, Mettmann, Germany, assignor to JMJ Werkzeugmaschinen GmbH fuer Feinbearbeitung, Mettmann, Germany

Filed Aug. 18, 1975, Ser. No. 605,762

Claims priority, application Germany, Sept. 3, 1974, 2442081

Int. Cl.² B24B *7/04*, *57/00*

U.S. Cl. 51—111 R **10 Claims**



1. A two wheel lapping machine for surface-, plane-parallel-, and external plain- lapping, comprising

a machine bed including a main shaft rotatably mounted therein, said main shaft having an upper end,

an upper frame including a crosspiece and a plurality of frame support means connected to said crosspiece and to said machine bed for rigidly supporting said crosspiece in a position spaced above said machine bed,

a slide horizontally displaceably mounted in said crosspiece,

a cylinder rotatably mounted in said slide,

a main sindle formed as a piston and mounted in said cylinder axially displaceable and non-rotatable relative to said cylinder, said main spindle having a lower end,

an upper lapping wheel carrier mounted on said lower end of said main spindle,

a lower lapping wheel carrier on said upper end of said main shaft, and

two lapping wheels mounted on said upper and lower lapping wheel carriers, respectively.

4,007,561

DEVICE FOR AUTOMATICALLY LAPPING VALVE SEAT

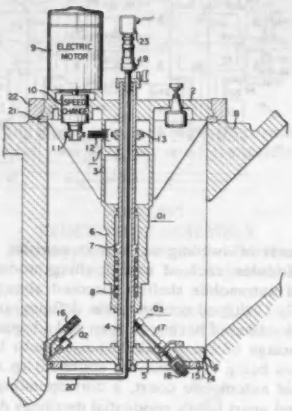
Masami Okano, Kita-kyushu; Morito Sadamura, Yukuhashi; Muraichi Iwasaki, Kita-kyushu; Takeshi Suzuki, Kita-kyushu; Yasushi Utunomiya, Kita-kyushu; Yoshihiro Yajima, Kita-kyushu; Yozi Yamauchi, Yukuhashi, and Yutaka Terawaki, Kita-kyushu, all of Japan, assignors to Okano Valve Seizo Kabushiki Kaisha

Filed Sept. 15, 1975, Ser. No. 613,300

Claims priority, application Japan, Sept. 17, 1974, 49-106021

Int. Cl.² B24B 9/00, 23/00

U.S. Cl. 51—241 VS 4 Claims



1. A device for automatically lapping a valve seat, comprising, in combination, a supporting plate for securing said device to a valve body including a valve seat to be lapped, a sleeve member pendent from the central portion of said supporting plate, a hollow driven shaft extending through both said supporting plate and said sleeve member to have one end portion slightly projecting beyond said supporting plate and the other end portion projecting beyond said sleeve member, fluid operated cylinder means disposed in said sleeve member on that side remote from the supporting plate, a piston member disposed on the driven shaft to cooperate with said cylinder means to longitudinally move said driven shaft, a lapping plate attached to the extremety of said other end portion of said driven shaft and including a peripheral edge capable of being intimately contacted by said valve seat through the longitudinal movement of said driven shaft when said supporting plate is positioned on said valve body, driving means for driving said driven shaft along with said lapping plate, and automatically supply means disposed on said lapping plate to automatically supply a lapping agent to said peripheral edge of said lapping plate.

4,007,562

GRINDING APPARATUS FOR COMMUTATORS

Hiroji Egashira, 6-25, 6-chome, Shinmachi, Hoya, Tokyo, Japan

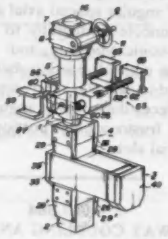
Filed Jan. 12, 1976, Ser. No. 648,742

Claims priority, application Japan, Sept. 26, 1975, 50-116854; Nov. 14, 1975, 50-136837

Int. Cl.² B24B 19/00

U.S. Cl. 51—244 6 Claims

1. A grinding apparatus for reforming a surface of a commutator of a motor comprising a guide sleeve, a main spindle slidably movable in said guide sleeve, feeding adjustment means on said sleeve for fine adjustment of movement of the spindle in the sleeve for adjusting the cutting depth of the main spindle relative to the commutator, holder means mounted on said main spindle for mounting a grinding stone, and clamping means mounted coaxially on said main spindle for installing the apparatus in an opening of a casing of the motor, said clamping means comprising a main clamp positionally adjustable relative to said guide sleeve and having opposite sides, subclamps releasably mounted on both sides of said main clamp and having respective channels, a sleeve



fitted in each said channel and having ends with engaging plates thereat, and an expanding threaded rod having a nut slidably inserted in each said sleeve and an end supporting said engaging plate, whereby rotation of said nut causes said expanding threaded rod to extend outwardly to forcedly engage said engaging plate against the opening of the casing of the motor.

4,007,563

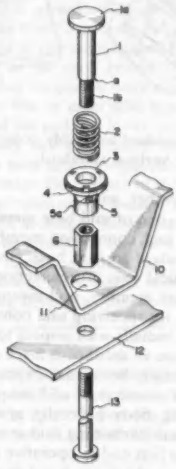
DECK ANCHOR

Momoki Nakagawa, 1-8-4 Sakai, Musashino, Tokyo, Japan

Filed June 2, 1975, Ser. No. 583,324

Int. Cl.² E04B 1/16

U.S. Cl. 52—98 6 Claims



1. In a deck anchor, for use in concrete building structures of the kind comprising:

i. a bolt including a head and a stem, said stem having a smooth portion adjacent said head and a screw-threaded portion remote from said head

ii. an assembly including a washer slidable on the smooth portion of the stem, and a coaxial collar slidable on the threaded portion of the stem, said washer and collar being formed of resiliently deformable material, and said collar being axially slotted, and

iii. a nut threadedly engaged on the threaded portion of said stem,

the improvements which comprises, in combination:

a. said stem having said threaded portion of less diameter

than said smooth portion thereof, thereby to present a radial shoulder where said portions meet

b. said collar including an internal radial shoulder adapted to abut against said radial shoulder of the stem, thereby to permit the transmission of axial driving force from the bolt to the collar in the direction from the bolt head towards the nut

c. said collar including a frusto-conical portion having a plurality of angular spaced axial slots, and a cylindrical portion connected integrally to the narrower end of said frusto-conical portion, and

d. said frusto-conical portion being connected at its broader end to said washer by a plurality of fracturable bridging pieces disposed at angularly spaced positions about said frusto-conical portion intermediate neighbouring axial slots.

4,007,564

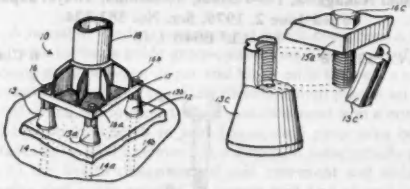
BREAKAWAY COUPLING AND ASSEMBLY

Douglas B. Chisholm, 1906 Memory Court, Vienna, Va. 22180

Continuation-in-part of Ser. Nos. 519,760, Nov. 12, 1974, abandoned, and Ser. No. 628,641, Nov. 4, 1975, abandoned, said Ser. No. 519,760, is a division of Ser. No. 350,173, April 11, 1973, abandoned, said Ser. No. 628,641, is a continuation of Ser. No. 539,089, Jan. 7, 1975, abandoned, which is a continuation of Ser. No. 350,173,. This application Mar. 23, 1976, Ser. No. 669,476

Int. Cl.² E04B *1/36*

U.S. Cl. 52—98 **10 Claims**



1. An upright standard assembly comprising the combination of a generally vertical standard,

a base member,

a connection member, and

means affixed to one of said base member or said standard for receiving said connection member to releasably attach said standard to said base member, and having a generally vertical axis of connection extending through said connection member, said means comprising

coupling means for receiving said connection member and for fracturing radially with respect to said axis of connection in response to an impact force applied to said standard in a generally horizontal direction generally normal to said axis of connection, said coupling means comprising a coupling body generally symmetrically disposed about any plane containing said axis of connection, said body having a first end in operative association with said base member, and a second end in operative association with said upright standard, at least one of said first and second end defining a connection member receiving opening therein, said connection member extending into said body a predetermined length along said axis of connection, said body having a plurality of V-shaped grooves which define regions of minimum strength, said grooves surrounding said connection member receiving opening of said coupling body and extending from said connection member receiving end of said body parallel to said axis of connection and extending at least the length of said predetermined length of said connection member received by said body, and extending so that upon an impact force in a generally horizontal direction acting upon said standard, said coupling means will radially fracture to thereby release said connection member and thereby provide detachment of said standard from said base member.

4,007,565

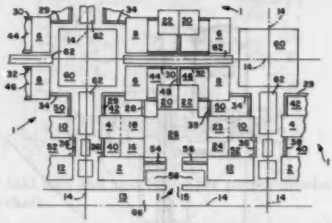
DWELLING MODULE

Richard Finnegan, P.O. Box 367, Saratoga, Calif. 95070

Continuation-in-part of Ser. No. 838,599, July 2, 1969, abandoned. This application Oct. 29, 1971, Ser. No. 193,631

Int. Cl.² E04B *1/00;* **E04H** *5/00*

U.S. Cl. 52—169.3 **5 Claims**



1. A cluster of dwelling modules comprising at least four dwelling modules, each of said dwelling modules having a plurality of automobile shelters disposed about in an inner substantially U-shaped configuration defining an automobile court interior thereof having an open end adequate to accommodate passage of automobiles from an auto thoroughfare, said shelters being in substantial abutment to minimize the area of said automobile court, a corresponding plurality of separate and apart family residential dwellings disposed in an outer substantially U-shaped configuration adjacently circumscribing said inner U-shaped configuration, each of said dwellings being disposed adjacent one of said shelters and including front entry means adjacent the exterior of said outer U-shaped configuration, and a walkway circumscribing the exterior of said outer U-shaped configuration and communicating with said front entry means to segregate primary pedestrian access on the exterior of said outer U-shaped configuration from auto access on the interior of said inner U-shaped configuration, four of said modules being disposed adjacent one another in a quadrantical arrangement with a corner of the U-shaped configuration of each module being adjacent the center of said arrangement, the walkways of said modules abutting one another and cooperating to form common malls.

4,007,566

COPING AND GUTTER FOR RIM FLOW SWIMMING POOLS

Victor D. Molitor, Denver, Colo., assignor to Stainless Equipment Company, Englewood, Colo.

Filed June 25, 1973, Ser. No. 373,143

Int. Cl.² E04H *12/00;* **E02D** *27/00*

U.S. Cl. 52—169.7 **10 Claims**

1. A rim flow swimming pool coping assembly having a nose over which water will flow to maintain a desired depth of water in the pool, comprising:

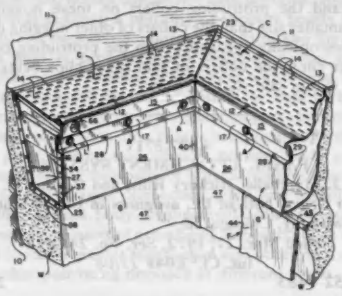
a. a longitudinally extended, corrosion resistant sheet having an upstanding nose at its front edge and a front wall depending from said nose, said sheet having a top wall extending rearwardly from said nose for a predetermined distance and having slots therein for drainage of water to a drain beneath said top wall;

b. support means for said sheet including a front support extending at a front position upwardly to said front wall which is disposed in overlapping relation to said support;

c. said support means having a rear support for said sheet;

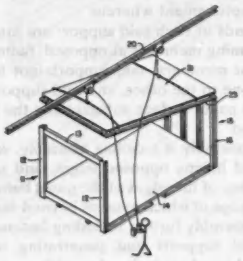
d. means connecting said sheet to said rear support; and

e. means at longitudinally spaced positions along said front wall connecting said front wall and front support, said



connecting means being adjustable to permit adjustment of said front nose upwardly and downwardly.

4,007,567
TRUCK BODY ASSEMBLY
Edward L. Mooney, and Kenneth L. Pritchard, both of Baltimore, Md., assignors to Pritchard-King, Inc., Baltimore, Md.
Division of Ser. No. 448,197, March 5, 1974, Pat. No. 3,882,592. This application Feb. 13, 1975, Ser. No. 549,662
Int. Cl.² B62D *23/00*
U.S. Cl. 52—262 **2 Claims**



1. The prefabricated parts used in assembling a truck body comprising

an underframe assembly;

first and second end wall assemblies on opposite ends of said underframe assembly;

a roof on said end wall assemblies having side edges and first and second end edges;

sidewall assemblies attached to said roof on opposite sides of said roof with vertical edges mating with vertical edges of said end wall assemblies;

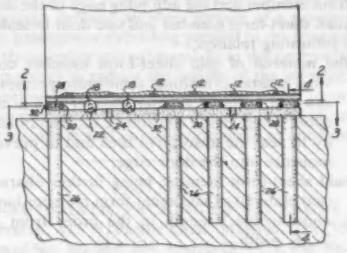
said roof having a rail along each of its edges with hooking means on both side edge rails, and means to hook said rail along said first end edge to said first end wall, and with a hookless cooperating means along said rail on said second end edge and said second end wall, with said hooking means of said side edge rails for attaching said sidewall assemblies to said roof by tilting said roof and sidewall assemblies in relation to each other to engage to each other;

said sidewall assemblies each having a complementary hooking means along its top edge to attach said side wall assemblies to said roof by attachment to said hooking means of said side edge roof rails,

said hooking means of said side edge roof rails having a horizontal portion extending outward from said roof, a hook on the outside edge of said horizontal portion, and a depending flange on the inside edge of said horizontal portion,

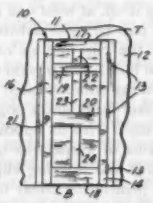
said complementary hooking means having a top cap complementary with said horizontal portion, a bulbous projection extending into said hook, and a slanted portion means opposite said bulbous projection for aiding the fitting of said complementary hooking means into said hooking means.

4,007,568
FOUNDATION FOR MODULAR BUILDINGS
Bernard D. Soble, 19151 Berkley, Detroit, Mich. 48221
Filed Mar. 10, 1975, Ser. No. 556,969
Int. Cl.² E02D *27/00*
U.S. Cl. 52—294 **2 Claims**



1. A foundation for retaining a modular building having an underframe employing a pair of elongated steel beams, comprising: a concrete pad having a horizontal surface with dimensions at least equal to the dimensions of the underside of the building; concrete piers formed through the pad and extending downwardly from the lower surface of the pad, said piers being arranged in two rows spaced from one another by the same distance as the steel beams of the building; first cylindrical steel tubes supported centrally through each pier, and with the upper end of each tube substantially flush with the upper surface of the pad, the lower end of each tube being disposed substantially below the lower surface of the pad; a plurality of second steel tubes having outer dimensions complementary to the inner dimensions of the first steel tubes so that the second steel tubes may telescope within said first steel tubes; and means for securing one end of each of the second steel tubes to the underside of the steel beams so that the second steel tubes telescope within the first steel tubes and allow vertical motion of the modular building relative to the pad while restraining horizontal movement.

4,007,569
METHOD AND MEANS FOR SEALING DOOR EDGES
Norman E. Hascall, 1035 E. State Street, Geneva, Ill. 60134
Filed Feb. 2, 1976, Ser. No. 654,167
Int. Cl.² E04C *2/20*
U.S. Cl. 52—309.3 **4 Claims**



1. In combination,

a wooden stile and rail door having vertical stiles and top

and bottom rails forming top and bottom door edges and such door edges normally constituting unfinished moisture-absorptive areas, and including sticking on each stile and on each rail formed in complementary male and female configurations and together with one another forming a matched joint between a corresponding stile and rail which intersects a corresponding top and bottom door edge, which joint is susceptible to expansion and will form a passage or leakage joint along which moisture may travel to the interior of the door,

a thin, continuous moisture-impervious sheet-form member for completely covering a door edge and for bridging said matched joint between the corresponding stile and rail to form a barrier blocking the passage or leakage joint and preventing leakage of moisture into the stiles, the rails, and the joints of the door,

and pressure-sensitive adhesion means between the sheet-form member and the adjoining edge of the door bonding such sheet-form member and said door in sealed-together conforming relation,

the material of said sheet-form member comprising a vinyl plastic exhibiting a moisture-permeability measured in terms of a water transfer rate in the order of about 2.0 gr. H_2O/100 square inches /24 hours, thereby to seal the absorptive area and to prevent entry of moisture into the door edge,

said sheet-form member being further characterized by said material of said sheet-form member having a minimum tensile strength in the order from at least 10 lb./in. width,

thereby to withstand expansion so that said sheet-form will continue to bridge and seal the matched joints for the purposes set forth.

4,007,570

SUPPORT FOR NOGGING STRIPS IN WALL FRAMES

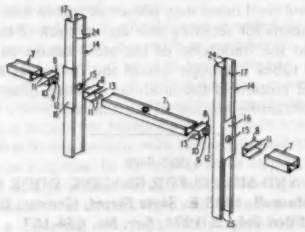
Richard Henry Hunter, Elanora Heights, Australia, assignor to Rondo Building Services Pty. Limited, Australia

Filed Feb. 18, 1975, Ser. No. 550,707

Claims priority, application Australia, Feb. 25, 1974, 6719/74

Int. Cl.² E04C *3/00*

U.S. Cl. 52—317 **5 Claims**



1. A wall frame comprising at least one pair of spaced upright studs with each stud of said pair being provided with an aperture at nogging level, at least one pair of nogging clips with each clip of said pair being of substantially U form with a hole in the base of the clip and an outwardly protruding collar surrounding said hole, each of said nogging clips of said pair having said protruding collar located within said aperture of a respective one of said studs, and a nogging strip supported between said pair of studs with its opposite end portions located between the arms of respective ones of said pair of nogging clips, said studs and nogging clips formed of folded sheet metal and each protruding collar formed by outwardly bending a marginal edge portion surrounding said hole, said studs being substantially C-shaped in cross section and having longitudinal formations facilitating interlocking two stud lengths in box form, said nogging strips provided in interlocked box form with a hole in one of their walls, certain of said nogging clips having elongated stepped arms extending through the open side of said C-shaped stud to the interior thereof, and the protruding collars on these nogging clips being of smaller size than the collars of other nogging clips and being telescopically engaged within the protruding collars of said other clips, the collars of said other clips being in turn received within said stud aperture.

4,007,571

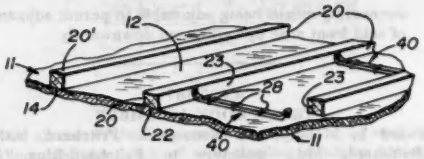
PANEL ATTACHMENT SYSTEM

Maurice J. Marchello, Hickory Hills, and Gordon H. Bassett, Buffalo Grove, both of Ill., assignors to United States Gypsum Company, Chicago, Ill.

Filed Mar. 27, 1972, Ser. No. 241,612

Int. Cl.² E04F *13/08*

U.S. Cl. 52—483 **2 Claims**



1. In an assembly including a panel, a plurality of spaced apart, generally coplanar framing members for supporting said panel and a plurality of elongate supports attached to one surface of said panel and extending between adjoining framing members; the improvement wherein

the opposite ends of each said support are attached to two adjacent framing members at opposed, facing surfaces of said adjacent members, said supports not being directly connected one to the other, and said supports intimately contact said panel surface substantially the length of the supports, and

wherein said assembly is a ceiling assembly, said panel is a ceiling board having opposed edges, and said members are rafters, one of the edges of the panel being attached to a rafter the edge of which extends beyond said edge of the panel said assembly further including fasteners straddling each of said supports and penetrating into, but not through, said panel, and wherein said fasteners are staples characterized as having a divergent extension of their ends, and wherein the supports are characterized by an anvil shape the sides of which diverge; whereby the supports cause the staples to take divergent shape as they are driven into the panel back surface over the supports.

4,007,572

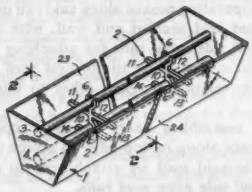
HOG SLAT REINFORCING BAR SUPPORT

Robert J. Ilukowicz, Coram, N.Y., assignor to Preco Industries, Ltd., Plainview, N.Y.

Filed Oct. 24, 1975, Ser. No. 625,635

Int. Cl.² E04C *5/16*; **E04G** *17/06*

U.S. Cl. 52—687 **4 Claims**



1. A hog slat reinforcing bar support comprising a one-piece

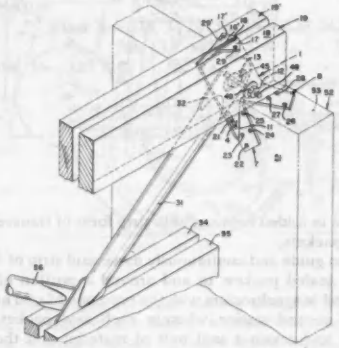
plastic body including first and second support portions for respective reinforcing bars, each portion including a surrounding wall with an opening through which a reinforcing bar can be inserted, means connecting said portions, and projecting members defining a plurality of support points by which said body can be stably supported in a form and the reinforcing bars held in predetermined positions within said form whereby upon the casting of concrete within said form the reinforcing bars will be placed within the cast body at predetermined positions therein, said support portions being aligned and said connection means comprising a straight connecting piece joining said support portions; said projecting members including two pairs of arms extending laterally with respect to said straight connecting piece and a projection at the bottom of said body in alignment with said connecting piece, one of said pairs of arms being disposed above the other pair and having a greater length than said other pair, said arms of said other pair being disposed at different levels.

4,007,573

TRUSS TOP BEARING CLIP

Tyrell T. Gilb, Berkeley, Calif., assignor to Simpson Manufacturing Co., Inc., San Leandro, Calif.

Filed Feb. 9, 1976, Ser. No. 656,308
Int. Cl.² E04C *3/02*
U.S. Cl. 52—696 **7 Claims**



1. A truss top-bearing clip comprising:
a. a generally rectangular planar metal sheet having side edges with a portion forming a web support portion;
b. said sheet is sheared along a line running generally parallel to the long dimension of said sheet, spaced from said side edges, dividing a portion of said sheet into first and second flanges;
c. said first flange is bent along a first bend line at an angular relation to said shear line so that said first flange is at right angles to said web support portion;
d. said second flange is bent along a second bend line at an angle to said shear line and at a greater angle to said first line so that said second flange is at a right angle to said web support portion and to said first flange; and
e. an opening formed in said web support portion.

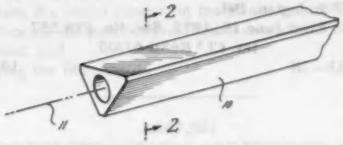
4,007,574

STRUCTURAL MEMBER AND SYSTEM

C. Randolph Riddell, 4141 Tennyson, Houston, Tex. 77005

Filed Sept. 22, 1975, Ser. No. 615,162
Int. Cl.² E04C *3/34, 3/30*
U.S. Cl. 52—722 **6 Claims**

1. A structural system, comprising:
a plurality of elongated structural members having substantially triangular cross-sections along the longitudinally extending axis of the elongated members, and said structural members including means joining said members together to provide a support framework skeleton of vertical and horizontal structural components transmitting forces in compression, tension, shear, bending, torsion and any combination thereof;
said substantially triangular cross-sections providing each member with three outer faces;



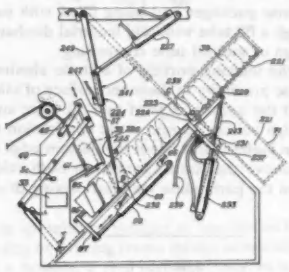
each member having a substantially circular axial passage therethrough defining an inner surface of a substantially circular passageway extending parallel to the longitudinal axis of the member and substantially at the centroidal axis of the member to reduce the weight of the member; and
non-supporting elements comprising electrical, plumbing, ventilation or sprinkler systems installed in said structural system for which said passageways serve as conduits.

4,007,575

SEMI-AUTOMATIC PACKING OF PACKAGES

Carl C. Hartman, 415 N. Pacific COH, Mineola, Tex. 75773

Division of Ser. No. 454, 449, March 25, 1974, Pat. No. 3,890,764, which is a division of Ser. No. 267,022, June 28, 1972, Pat. No. 3,815,321. This application Mar. 5, 1975, Ser. No. 555,567
Int. Cl.² B65B *35/40*
U.S. Cl. 53—26 **2 Claims**



1. A method of semi-automatically packing packages being supplied by automatic packagi.g apparatus at a rapid rate, comprising the steps of:
a. diverting said packages into at least one upstanding chute;
b. accumulating respective said packages from said at least one chute on a gate;
c. transferring said packages from said gate into an inclined load chute in fromt of an active ram in a desired position; said load chute being inclined at an angle sufficient for said packages to retain said desired position as they are advanced along said chute by said active ram;
d. providing clearance in said load chute for a next plurality of packages transferred from said gate by advancing said active ram and said packages deposited in front thereof; holding said packages; and retracting said active ram to receive an additional plurality of packages from said gate;
e. repeating steps a-d until a pre-determined number of packages have been accumulated in said load chute; and, thereafter,
f. activating a surge means to move said predetermined number of packages from directly in front of an active

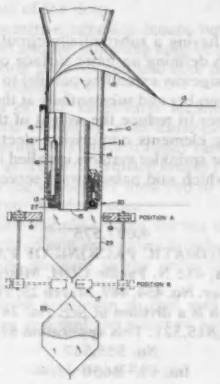
ram; and emplacing said pre-determined number of packages into a container.

4,007,576

METHOD AND APPARATUS FOR CONTROLLING STATIC CHARGES

Bruce E. Metz, Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed June 19, 1975, Ser. No. 588,557
Int. Cl.² B65B *61/00*
U.S. Cl. 53—28 **10 Claims**



1. A method for controlling static charges on moving film being formed into packages and being filled with particulate material through a fill tube with said material discharging past the bottom edge of said fill tube comprising:

positioning the ionizing portion of a static elimination device in close proximity to the inner surface of said moving film and at the bottom edge of said fill tube; and

applying a high voltage to said static elimination device to produce an ionized field about the bottom edge of the fill tube to remove the static charges on both said moving film and on the particulate material passing through said field.

4,007,577

APPARATUS FOR PACKAGING FLUID MATERIALS IN PACKETS

Ernest L. Matthews, and Ralph E. Matthews, both of Decatur, Ala., assignors to Matthews Machine Company, Inc., Decatur, Ala.

Division of Ser. No. 474,164, May 29, 1974, Pat. No. 3,923,084. This application May 22, 1975, Ser. No. 579,930
Int. Cl.² B65B *9/08*
U.S. Cl. 53—180 R **3 Claims**

1. In an apparatus for dividing fluid material into uniform units and for packaging the units, which includes:

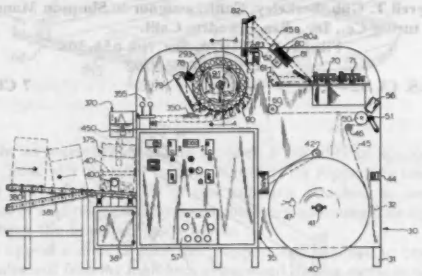
a. a hollow cylindrical filling drum containing a volume of fluid material to be dispensed in discrete units;

b. a plurality of uniformly spaced and circularly arranged metering trap chambers formed on the periphery of said drum for rotation as an integral filling structure around a central horizontal axis, each chamber providing at least one open non-linear elongated fluid material flow path extending between an inlet communicating with the interior of said drum and an outlet laterally displaced along said flow path;

c. means for rotating said filling structure at a uniform predetermined speed and in a constant direction around said central axis, each chamber being adapted on each rotation and at said speed to communicate its respective inlet with the interior of said drum at a first rotative station, to receive a portion of said fluid material into said flow path, to discharge through said inlet as said chamber rotates away from said first station all except a quantity equal to one unit of said material, and to guide said unit along said flow path towards said outlet under the influence of the rotative forces asserted thereon as said chamber rotates at said speed towards a second rotative station whereby said unit is discharged from said outlet during passage of said chamber past said second station;

d. material supply means including a storage receptacle containing a volume of said material, conveyor means arranged to convey said material from said receptacle to said drum and leveling means independently controlling said conveyor means whereby said conveyor means may operate independently of said drum and being effective to operate said conveyor means intermittently as required to maintain a predetermined level of material in said container;

the improvement, comprising:



e. a source in folded heat-sealable strip form of transversely sealed packets;

f. means to guide and continuously move said strip of transversely sealed packets to and around a portion of said drum and in synchronism with the presence of said outlets at said second station wherein each said packet may receive and retain a said unit of material and then be moved to a longitudinal sealing station; and

g. longitudinal sealing means at said longitudinal sealing station including a longitudinal sealer and means to tension said strip while passing through said longitudinal sealer, said longitudinal sealer comprising a pair of electrically heated laterally spaced bars adapted to receive and longitudinally seal the tops of said packets as the same are passed through and between said bars, said bars providing opposed parallel rectangular heating surfaces having plural changes in direction of curvature from end to end and adapted to cause said packet tops to follow an undulating path during longitudinal sealing thereof whereby the top portions of the opposite external sides of said packet are alternately contacted and heated during said longitudinal sealing.

4,007,578

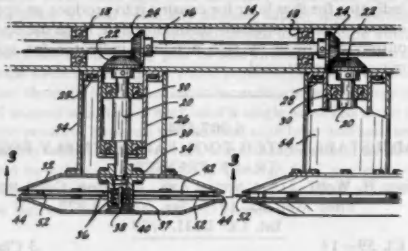
MOWER

Eugene C. Borstel, Jr., Oregon City, Oreg., assignor to Omark Industries, Inc., Portland, Oreg.

Filed Dec. 18, 1975, Ser. No. 641,999
Int. Cl.² A01D *55/18*
U.S. Cl. 56—295 **5 Claims**

1. A mower including a carrier adapted for rotation about an axis defining a circular path at the outermost extension of the carrier, a flexible elongated member having at least one cutter fastened thereto, and mounting means mounting the elongated member to the carrier at spaced locations substan-

tially in the plane defined by said circular path with the cutter positioned between said locations and extended outwardly of the circular path, and further including guard means com-



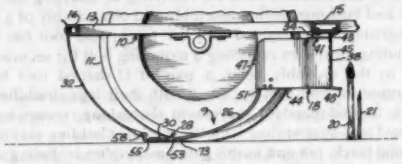
prised of a protective edge adjacent to and inwardly of the outwardly extended cutter whereby upon impact of the cutter with a hard object the flexible elongated member flexes inwardly to withdraw the cutter behind the protective edge.

4,007,579

SELECTIVE ASPARAGUS HARVESTER

Leslie Wadekamper, 17 Lowe Ahtanum Road, Yakima, Wash. 98903

Filed Nov. 28, 1975, Ser. No. 635,863
Int. Cl.² A01D *45/00*
U.S. Cl. 56—327 A **5 Claims**



1. An asparagus harvester cutting assembly for selectively cutting mature spears having a prescribed height without cutting immature spears having a lesser height, as the harvester is propelled over the ground, comprising:

a cutting knife subassembly for riding on the soil surface having a blade adapted for cutting the mature spears at ground level;

a pair of guide wires attached to the cutting knife subassembly and extending forward therefrom to forward ends for guiding the cutting blade to the mature spears;

a sensing means operatively mounted to the harvester forward of the cutting knife subassembly at the prescribed height and connected to the front ends of the guide wires for sensing the lateral position of the mature spear and laterally moving the front ends of the guide wires and cutting knife subassembly laterally into alignment with the sensed mature spear to receive the mature spear.

4,007,580

METHOD FOR THE MANUFACTURE OF TWISTLESS OR SUBSTANTIALLY TWISTLESS YARN AND YARN WHENEVER MANUFACTURED BY THE APPLICATION OF THIS METHOD

Jan Nijhuis, Hengelo (O), Netherlands, assignor to Hollandse Signaalapparaten B.V., Hengelo, Netherlands

Filed Apr. 23, 1975, Ser. No. 570,729
Claims priority, application Netherlands, May 6, 1974, 7406030
Int. Cl.² D02G *3/04, 3/40*
U.S. Cl. 57—140 BY **7 Claims**

1. Method of manufacturing twistless yarn or substantially twistless yarn from a sliver or roving comprising at least two staple fibre components of which at least one is potentially adhesive upon the application of at least a liquid, including the sequential steps of:

a. applying liquid to the sliver or roving;

b. wet-drafting the sliver or roving to a thinner fibre strand;

c. false twisting said thinner fibre strand;

d. reapplying liquid to the false twisted fibre strand to increase the liquid content in the fibre strand;

e. activating the potentially adhesive component in the fibre strand; and

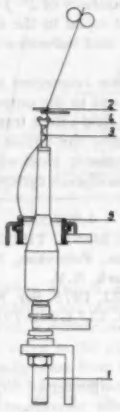
f. drying the fibre strand.

4,007,581

METHOD FOR THE SPINNING AND TWISTING OF YARN ON RING SPINNING FRAMES AND TWISTING FRAMES

Rolf Langer; Peter Thierfelder, and Harald Geisler, all of Karl-Marx-Stadt, Germany, assignors to VEB Spinnereimaschinenbau, Karl-Marx-Stadt, Germany

Filed Sept. 18, 1975, Ser. No. 614,385
Claims priority, application Germany, Oct. 25, 1974, 0118190
Int. Cl.² D01H *7/58*
U.S. Cl. 57—156 **3 Claims**



1. In the spinning or twisting of continuous fibrous material at a spinning or twisting frame station comprising a spindle for carrying a bobbin, a ring concentrically mounted about the spindle and supporting a traveler for guiding the fibrous material onto the bobbin, and means for driving the ring and spindle, the improvement comprising engaging the fibrous material at the head of the spindle thereby to reduce or eliminate ballooning of the fibrous material and rotating the ring and the spindle asynchronously with the ring being driven at a lesser rate than the spindle thereby to decrease the tension on the yarn.

4,007,582

METHOD AND APPARATUS FOR SYNCHRONIZING AN ELECTRODYNAMIC CLOCKWORK DRIVE

Robert W. Dugan, and Charles R. Edson, both of Saratoga, Calif., assignors to Eurosil, G.m.b.H., Munich, Germany

Filed Mar. 12, 1974, Ser. No. 450,355
Claims priority, application Germany, Mar. 13, 1973, 2312412
Int. Cl.² G04C *3/00*
U.S. Cl. 58—23 A **7 Claims**

1. A circuit for synchronizing electrodynamic clockwork drives having a first and second inductor and two permanent magnet assemblies wherein said magnet assemblies are moved

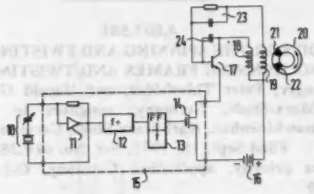
relative to said inductors by a mechanical oscillation system having the inherent frequency f, comprising:

a switching transistor having a conducting circuit coupled to a power supply and a control circuit;

said first inductor being disposed in series in the conducting circuit of said switching transistor;

said second inductor being disposed in the control circuit of said switching transistor whereby current pulses induced in said second inductor by said magnet assemblies switch said switching transistor to its conducting state;

a source of synchronizing pulses including a series connec-



tion of a quartz controlled oscillator, a frequency divider and a one-shot multivibrator producing synchronizing pulses having a frequency of $2^a \cdot f$ where $a = 1,2,3 \ldots$ and a duration at least equal to the duration of the current pulses induced in said inductors by said magnet assemblies; and

a field-effect transistor connected in series in one of said transistor circuits and to the output of said multivibrator for triggering said field-effect transistor by said synchronizing pulses whereby the circuit automatically synchronizes an electrodynamic clockwork drive connected to said mechanical oscillation system.

4,007,583

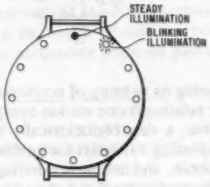
ELECTRONIC TIMEPIECE

Edward Oscar Johnson, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed May 22, 1975, Ser. No. 579,962

Int. Cl.² G04B *19/24*

U.S. Cl. 58—50 R **10 Claims**



1. An electronic timepiece comprising, in combination:

an electrooptical analog display comprising only 12 indicators spaced from one another in positions corresponding to the 12 hour markers on the face of a timepiece, said indicators occupying substantially similar areas and being of substantially similar shape and being distinguishable from one another, in their unactuated condition, only in their relative positions in the display; each indicator representing a different hour when employed to indicate hours, and each representing a different five minute increment when employed to represent minutes;

means for producing hours signals, one for each of the 12 hours making up a half day;

means for producing 5 minute signals, one for each of the 5 minute intervals making up an hour;

means responsive to the production of a five minute signal for selecting and actuating the one of the 12 indicators representing that 5 minute time interval for causing it to produce an optical output; and

means responsive to the production of an hours signal, when that signal represents an hour different from that which would be indicated by the indicator actuated in response to said 5 minute signal, for selecting and actuating the indicator for that hour for causing it to produce an optical output which is optically distinguishable from the optical output produced by said actuated indicator for said 5 minute time interval.

4,007,584

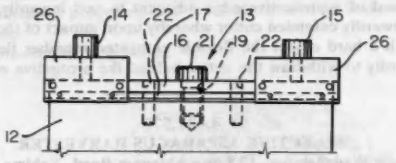
ADJUSTABLE PITCH TOOL BAR ASSEMBLY FOR TRACK PRESSES

William H. Wolff, 216 Atherton Ave., Atherton, Calif. 94025

Filed Mar. 22, 1976, Ser. No. 668,977

Int. Cl.² B21L *5/00*

U.S. Cl. 59—11 **3 Claims**



1. An adjustable pitch tool bar assembly for mounting on the movable head of a track press of the type adapted to receive a track chain having pins and bushings and present the chain to the movable head for removing or inserting the track pins and bushings during assembly and disassembly of a track comprising: an elongated tool bar track, said tool bar track including means for receiving a mounting bolt for securing the bar to the movable head, a pair of U-shaped tool blocks mounted on said tool bar track with their legs straddling the track for independent movement therealong, means carried by said legs cooperating with the track for holding said blocks on said track, pin and bushing tool assemblies including securing means, and means on said blocks for receiving said pins and bushing tool securing means to hold said pin and bushing tool assemblies whereby the blocks may be moved along the track to adjust the spacing of the pin and bushing tools to accommodate various track pitches.

4,007,585

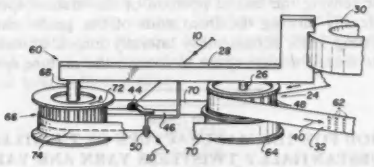
TAPE TYPE YARN FEED SYSTEM FOR A KNITTING MACHINE

Robert Vossen, 35 E. Woods Drive, Huntington, N.Y. 11743

Filed Nov. 20, 1975, Ser. No. 633,711

Int. Cl.² D04B *15/48*

U.S. Cl. 66—132 T **1 Claim**



1. In a knittng machine of the type having a control tape for causing yarn feed movement from elevated supply stations to knitting stations located beneath and in vertically aligned relation to said supply stations, the improvement thereto comprising an arrangement of rotatable tape-supporting wheels operatively arranged to support a closed loop of said control tape in surrounding relation about said vertically aligned supply and knitting stations and thereby to be powered in rotation in response to longitudinal movement of said con-

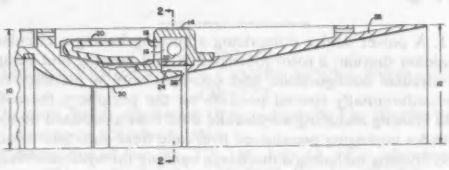
trol tape in a looped path, a first auxiliary wheel connected in depending relation to each of a cooperating one of said tape-supporting wheels so as to rotate in unison therewith, a second auxiliary wheel rotatably mounted in an operative clearance position from each said first auxiliary wheel and in a radial orientation to said vertically aligned supply and knitting stations, a radially oriented second closed loop of tape entrained about each cooperating pair of said first and second auxiliary wheels so as to be urged by said rotation of said first auxiliary wheel through feed movement including a partial wrap about said second auxiliary wheel, and a single yarn fed in an interposed position between said second tape loop and said second auxiliary wheel at said partial wrap therebetween so as to be urged by said second tape loop through feed movement at a speed corresponding to the movement speed of said control tape but without actual contact therewith.

4,007,586

SPIN NOZZLE AND THRUST AUGMENTOR MECHANISM

Joseph J. McDermott, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 10, 1975, Ser. No. 630,114
Int. Cl.² F02K *1/24*
U.S. Cl. 60—201 **3 Claims**



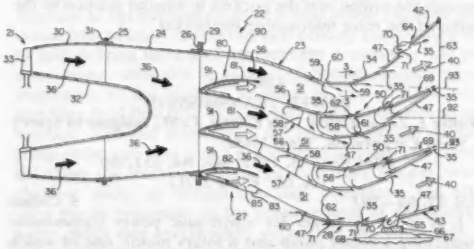
1. A spin and thrust augmentor mechanism for pre-spinning a missile prior to launching and increasing total missile thrust comprising: a missile having a main motor diameter of the same diameter as the motor exhaust exit cone; a plurality of spin nozzles disposed within and around said main motor diameter, said nozzles including a chamber provided with a fuel or gas inlet and an exit outlet, said nozzle exit outlet being smaller in size than said nozzle inlet to compress gas exiting therefrom and a plenum chamber disposed to collect the spin exhaust gases from all of said nozzles and to direct said gases into the motor exhaust cone to increase missile thrust.

4,007,587

APPARATUS FOR AND METHOD OF SUPPRESSING INFRARED RADIATION EMITTED FROM GAS TURBINE ENGINE

Clifford R. Banthin, Easton; Gary W. Decko, Wethersfield, and John F. Hurley, Huntington, all of Conn., assignors to Avco Corporation, Stratford, Conn.

Filed Nov. 19, 1975, Ser. No. 633,226
Int. Cl.² F02K *1/02, 1/26*
U.S. Cl. 60—204 **25 Claims**



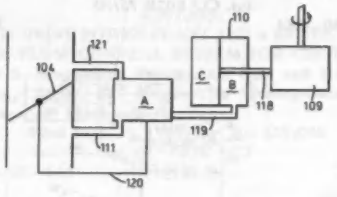
1. An apparatus for suppressing infrared radiation emitted from hot metal parts at the aft end of a gas turbine engine and from the exhaust gas plume thereof during engine operation comprising a dual purpose ejector vane assembly operatively attached to said engine for introducing cooling ambient air into the hot engine exhaust gases and hiding said hot metal parts and means attaching said vane assembly to said engine, said vane assembly comprising, a tubular duct structure for receiving a confining said engine exhaust gases, and ejector means providing at least one stream of cooling ambient air completely across said duct structure to break the exhaust gases confined by said duct structure during engine operation into a plurality of separate exhaust gas streams and provide optimum mixing of said one stream with said exhaust gases completely across said duct structure.

4,007,588

IDLING AND PART-LOAD CONTROL OF IGNITION DISTRIBUTOR RESPONSIVE TO PRESSURE UPSTREAM OR DOWNSTREAM OF THROTTLE VALVE

Klaus Müller, Seevetal, Germany, assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed May 20, 1974, Ser. No. 471,598
Claims priority, application Germany, May 22, 1973, 2325807
Int. Cl.² F01N *3/00*; F02P *5/04*
U.S. Cl. 60—274 **5 Claims**



1. A method of operating a spark ignition automotive engine provided with an exhaust gas reactor device, said engine having an intake manifold, a carburetor connecting with said manifold and a throttle valve in the carburetor, said method comprising retarding the ignition from normal spark timing of said engine during engine-part-load solely in response to the pressure upstream of the throttle valve; and, retarding the ignition from normal spark timing of said engine during engine-idling solely in response to the pressure downstream of the throttle valve, said retarding during engine-idling being greater than the retarding during engine-part-load.

4,007,589

INTERNAL COMBUSTION EXHAUST CATALYTIC REACTOR MONITORING SYSTEM

Horst Neidhard, Korntal; Ernst Linder, Muhlacker; Josef Wahl, Stuttgart; Peter Jürgen Schmidt, Schwieberdingen, all of Germany, and Peter A. Schoeck, Balzers, Liechtenstein, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

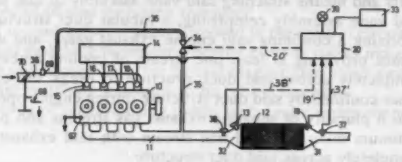
Division of Ser. No. 436,863, Jan. 28, 1974, Pat. No. 3,962,866. This application Feb. 20, 1976, Ser. No. 659,716
Claims priority, application Germany, Jan. 31, 1973, 2304622
Int. Cl.² F01N *3/15*
U.S. Cl. 60—276 **12 Claims**

1. Catalytic reactor monitoring system to supervise operation of a catalytic reactor (12) connected to the exhaust system of an internal combustion engines, to detoxify exhausted gases from the engine, comprising

at least two oxygen sensor elements (19, 38), one exposed to exhaust gases upstream, and the other downstream of the reactor (12) to respectively determine oxygen content in the exhaust gases from the internal combustion

engine upstream, and downstream of the reactor each including an ion conductive solid electrolyte (21) forming an ion concentration chain;

a detection circuit (20) including a difference circuit having



its respective terminal connected to the respective sensor elements to determine the difference in output signals from the sensor elements

and response means (39, 34) responsive to the output signal from the detection circuit (20).

4,007,590

CATALYTIC CONVERTOR WARMING UP SYSTEM

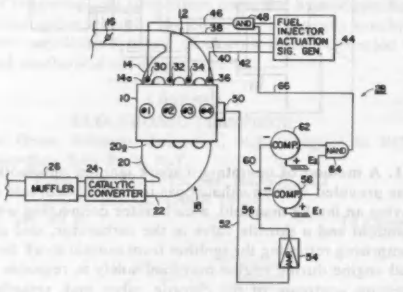
Tadashi Nagai, Yokosuka, and Kunihiko Sugihara, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Japan

Filed May 30, 1975, Ser. No. 582,275

Claims priority, application Japan, June 1, 1974, 49-626340

Int. Cl.² F02B *75/10*

U.S. Cl. 60—284 **3 Claims**



1. A fuel injection system for a multi-cylinder type internal combustion engine employing a catalytic converter in the exhaust system thereof comprising:

a plurality of fuel injection valves respectively disposed in branch passages of an intake manifold of said engine, each of said valves being electronically operable by a fuel injector actuation signal;

a temperature sensor mounted on said engine for producing a temperature signal representing the temperature of said engine;

a fuel injector actuation signal generator having output terminals respectively connected to said fuel injection valves, for generating fuel injector actuation signals on the output terminals thereof;

an AND gate having one input terminal connected to one of said output terminals of the fuel injector actuation signal generator, and an output terminal connected to the associated fuel injection valve;

a first comparator for generating a logic 1 signal when the magnitude of the temperature signal is larger than a relatively low predetermined level;

a second comparator for producing a logic 1 signal when the magnitude of the temperature signal is lower than a relatively high predetermined level; and

a NAND gate for producing a logic 0 signal when it receives both of said logic 1 signals from said first and second comparators and for applying said logic 0 signal to the other input terminal of said AND gate for preventing said associated fuel injection valve from opening.

4,007,591

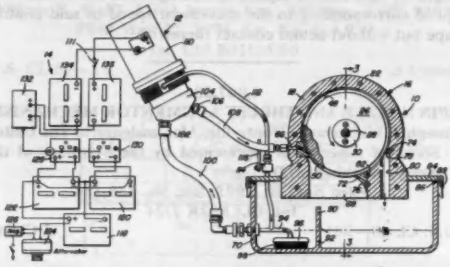
POWER DEVICE

Leslie R. Hinchman, and Robert B. Hinchman, both of San Benito, Tex., assignors to Bessie L. Caldwell, San Benito, Tex., a part interest

Filed May 16, 1975, Ser. No. 578,164

Int. Cl.² F15B *15/18*

U.S. Cl. 60—325 **5 Claims**



1. A power device comprising a housing having a circular chamber therein, a rotor journaled in said housing and being of circular configuration and provided with a plurality of circumferentially spaced pockets on the periphery thereof, said housing including a hydraulic fluid inlet associated therewith for impinging pressurized hydraulic fluid onto said rotor, said housing including a discharge opening for hydraulic fluid at the bottom thereof for gravity discharge of hydraulic fluid after it impinges against the rotor and causes rotation of the rotor, a reservoir tank for the hydraulic fluid disposed below said housing and receiving hydraulic fluid therefrom, pump means having an intake communicated with the tank and an outlet communicated with the inlet in the housing for circulating hydraulic fluid from the tank into the housing under pressure, said pump means including an electric motor connected therewith, and an electrical assembly for supplying electrical energy to said pump motor, said rotor including drive means associated therewith extending externally of the housing for connection with a device for utilizing the rotational output from the rotor, said housing including an injector block having an inner surface sealingly engaged with the periphery of the rotor, said injector block including a discharge orifice therethrough communicating with the pump means, said rotor having peripheral edge shoulders, said injector block having spaced ribs engaging the shoulders and a central channel receiving the portion of the rotor between the shoulders, said pockets in the motor being generally tapered in configuration and provided with an abutment wall in the leading end thereof disposed in substantially perpendicular relation to the orifice as the pocket passes the orifice, said injector block being disposed below the horizontal center of the rotor for imparting torque thereon when pressurized hydraulic fluid is discharged through the orifice into the pockets in angular relation to the radius of the rotor intersecting the pocket.

4,007,592

POWER TRANSMISSION

Walter J. Zoya, Rolling Hills Estates, Calif., assignor to Sperry Rand Corporation, Troy, Mich.

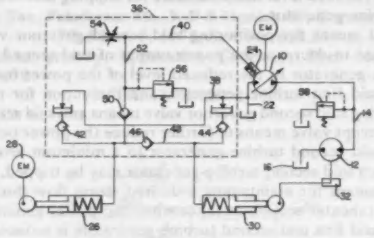
Filed Nov. 13, 1975, Ser. No. 631,760

Int. Cl.² F15B *21/12*

U.S. Cl. 60—391 **5 Claims**

1. A speed controller for a hydraulic power transmission comprising a rotary pump and a rotary motor, one of which has a regulator for its displacement, the controller comprising

a reference hydraulic pulse generator for producing an alternately reversing flow of a predetermined quantity, a feed-back pulse generator for producing another alternately reversing flow of a similar quantity, reference means for driving the reference pulse generator at a desired speed, means driving



the feed-back pulse generator proportionally to the motor speed, and a circuit connecting the two pulse generators to the displacement regulator, to maintain the motor speed in step with the reference means speed in response to error signals produced by relative phase changes between the two pulse generators.

4,007,593

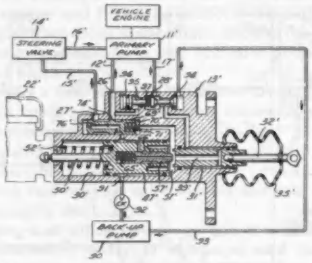
MOTOR VEHICLE OPEN CENTER SERIES HYDRAULIC CIRCUIT

James P. Baker, Cleveland, Ohio, assignor to The Weatherhead Company, Cleveland, Ohio

Continuation of Ser. No. 379,319, July 16, 1973, abandoned. This application June 30, 1975, Ser. No. 591,842

Int. Cl.² B60T *13/18*

U.S. Cl. 60—548 **5 Claims**



1. A motor vehicle fluid power circuit comprising a primary pump having an inlet side and an outlet side, a steering valve, a brake booster having an inlet side and an outlet side, and an auxiliary pump having an inlet side and an outlet side, said steering valve being an open center valve, said brake booster having a fluid power chamber and a power piston movable in response to the working pressure in said power chamber, first means hydraulically connecting said primary pump outlet side to said steering valve and hydraulically connecting said primary pump outlet side to said brake booster, second means responsive to the working pressure of said brake booster throttling fluid flow from said primary pump outlet side to said steering valve and maintaining the pressure of said primary pump outlet side at at least a predetermined pressure differential above the working pressure of said brake booster power chamber under all normal operating conditions, and pilot valve means responsive to the pressure level of said primary pump outlet side hydraulically connecting the outlet side of said brake booster to the inlet of said auxiliary pump under emergency conditions when said primary pump is inoperable

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4,007,594

AUTOMOTIVE DRIVE SYSTEM SUMMING MULTIPLE INDEPENDENT DRIVES IN THE DIFFERENTIAL HOUSING

John W. Elsea, Jr., Rte. 2, Box 121-A, Laceys Spring, Ala. 35754

Filed July 30, 1974, Ser. No. 493,172

Int. Cl.² F01K *23/10*; F16H *37/06*

U.S. Cl. 60—618 **4 Claims**

1. An automotive drive system comprising:
- a differential housing and ring gear rotatably mounted therein;
- a differential gear assembly attached to said ring gear and including gear means for differentially driving a pair of axles;
- bearing means supported by said housing and comprising bearings on opposite sides of said housing;
- first and second discrete shafts, each supported by a said bearing means and extending through said housing;
- a first pinion gear rigidly attached to said first shaft and positioned to engage and drive said ring gear and a second pinion gear rigidly attached to said second shaft and positioned to engage and drive said ring gear;
- an internal combustion engine and means coupled to said engine for rotatably driving said first shaft; and
- a steam engine and means coupled to said steam engine for driving said second shaft.

4,007,595

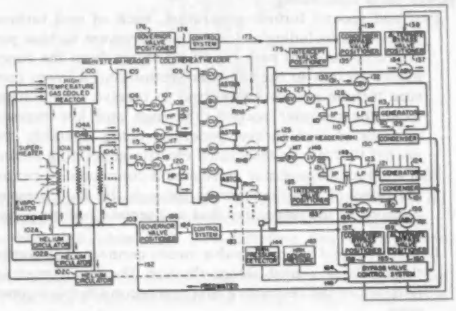
DUAL TURBINE POWER PLANT AND A REHEAT STEAM BYPASS FLOW CONTROL SYSTEM FOR USE THEREIN

Andrew S. Braytenbah, Pennsauken, N.J., and Karl O. Jaegtnes, Chester, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 30, 1975, Ser. No. 618,096

Int. Cl.² F01K *7/22*

U.S. Cl. 60—644 **25 Claims**



1. A power plant comprising,
- a steam source to generate superheat and reheat steam,
- a first turbine-generator including at least a first high-pressure turbine portion operated by superheat steam, a first lower pressure turbine portion operated by reheat steam, and an electric generating means rotatably driven by said first high and first-lower pressure turbine portions,
- a second turbine-generator including at least a second high-pressure turbine portion operated by superheat steam, a second lower pressure turbine portion operated by reheat steam, and an electric generating means rotatably driven by said second high and second lower pressure turbine portions,
- first bypass means for conducting reheat steam from said steam source,
- second bypass means for conducting reheat steam from said steam source, and
- means for comparing a measured value of the pressure of reheat steam with a desired value of such pressure to detect a difference between such values, and for varying

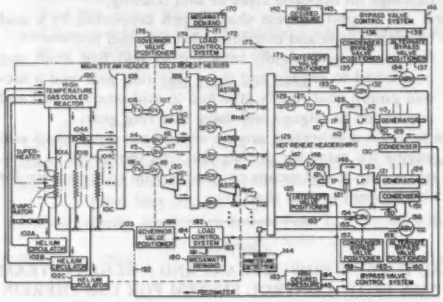
the combined steam flow through said first and second bypass means to reduce a detected difference to a zero steady state level.

4,007,596

DUAL TURBINE POWER PLANT AND METHOD OF OPERATING SUCH PLANT, ESPECIALLY ONE HAVING AN HTGR STEAM SUPPLY

Andrew S. Braytenbah, Pennsauken, N.J., and Karl O. Jaegtnes, Chester, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Apr. 24, 1975, Ser. No. 571,145
Int. Cl.² F01K *13/02*
U.S. Cl. 60—652 **33 Claims**



1. A power plant having a high temperature gas-cooled nuclear reactor and a steam source to derive heat from the coolant gas of the reactor for generating superheat and reheat steam in respective superheater and reheater sections, said power plant comprising,

first and second turbine-generators, each of said turbine-generators including at least a high pressure turbine portion connected to pass superheat steam from the superheater section to the reheater section and a lower pressure turbine portion connected to receive reheat steam from the reheater section, the high and low pressure portions of each turbine-generator being rotatably connected to drive an associated electric generating means,

first and second governor valve means connected to control the flows of superheat steam through the high pressure portions of the respective first and second turbine-generators,

first and second intercept valve means connected to control the flows of reheat steam through the lower pressure portions of the respective first and second turbine-generators,

main steam bypass means connected to pass superheat steam from the superheater section to the reheater section without passage through the high pressure turbines to permit a desired minimum flow of steam through such section at times when the total steam flow through the high pressure portions of said first and second turbine-generators is less than such minimum,

means for collecting steam after its passage through the high pressure portions of said first and second turbine-generators and through said main steam bypass means, and for passing the collected steam through the reheater section, at least a portion of the steam flow through the reheater section being passed from said steam collecting means through an auxiliary steam turbine means before such portion is reheated, which auxiliary steam turbine means is rotatably coupled to drive a means for circulating the coolant gas through the reactor and the steam source,

hot reheat bypass means connected to pass reheat steam from said collecting means to the reheater section without passage through the auxiliary turbine means to permit a desired minimum steam flow through such section at times when the total steam flow through the auxiliary turbine means of said first and second turbine-generators is less than such minimum,

first means for positioning said first governor valve means to decrease the power output of said first turbine-generator to a reduced level that is suitable for tripping said second turbine-generator,

second means for positioning said second governor valve means to decrease the power output of said second turbine-generator to the reduced level of the power output of said first turbine-generator, and thereupon for positioning said second governor valve means and said second intercept valve means to further reduce the power output of said second turbine-generator to a minimum level at which said second turbine-generator may be tripped, and

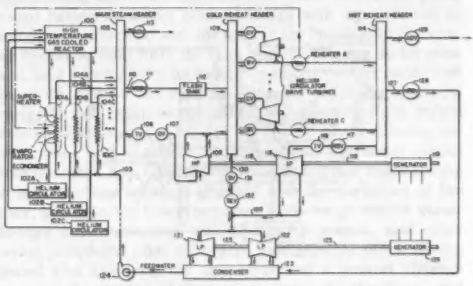
third means for maintaining a desired steam flow through the reheater section at times when the power generated by said first and second turbine-generators is reduced to a level such that the combined steam flow through the lower pressure turbine portions is less than the desired flow, said third means being responsive at least to changes of a predetermined power plant variable that is related to the flow through the reheater section to govern the flow through said hot reheat bypass means, whereby the desired flow is maintained.

4,007,597

POWER PLANT AND SYSTEM FOR ACCELERATING A CROSS COMPOUND TURBINE IN SUCH PLANT, ESPECIALLY ONE HAVING AN HTGR STEAM SUPPLY

Karl O. Jaegtnes, Chester Heights, Pa., and Andrew S. Braytenbah, Pennsauken, N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 30, 1975, Ser. No. 618,097
Int. Cl.² F01K *13/02*
U.S. Cl. 60—707 **29 Claims**



1. A power plant comprising,

a steam source to generate superheat and reheat steam;

a cross compound turbine-generator including, a high pressure turbine portion operated by a first flow of superheat steam, an intermediate turbine portion operated by a second flow of reheat steam, and a first electrical generating means rotatably driven by said high and intermediate pressure turbine portions, and a second electrical generating means rotatably driven by a low pressure turbine portion operated by the second flow after it is exhausted from the intermediate pressure portion;

first bypass means for conducting a flow of superheat steam from said steam source to a steam exhaust of said high pressure turbine portion;

second bypass means for conducting a flow of reheat steam from said steam source to a steam exhaust of said low pressure turbine portion; and

control means for independently governing the first and second flows, wherein one of the first and second flows is varied for purposes of controlling the rotational speed of said first electrical generating means in accordance with a

desired value of such speed, while the other of the first and second flows is varied to regulate a power plant variable in accordance with its desired value.

4,007,598

ARTIFICIAL ISLAND AND METHOD OF ASSEMBLING THE SAME

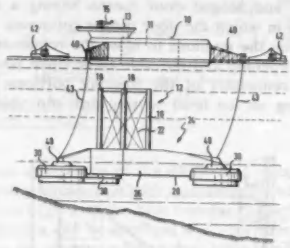
Hans Tax, Potsdamer Str. 3, D-8 Munich 40, Germany

Filed Dec. 8, 1975, Ser. No. 638,338

Claims priority, application Germany, Dec. 16, 1974, 2459478

Int. Cl.² E02D *17/00*

U.S. Cl. 61—90 **8 Claims**



1. In a method of assembling, in a body of water, an artificial island consisting essentially of a platform and of at least one upright supporting column including a bottom portion standing on the floor of said body of water and a plurality of sections extending upward from said bottom portion in superimposed relationship, said platform being supported by said at least one column in an operative position above the surface of said body of water, in which method said column and said platform are floated on the surface of said body to a desired location, the column is lowered in said water until said bottom portion engages said floor, the platform thereafter is raised above said surface along said column, and the raised platform is fastened to said column in said operative position, the improvement which comprises:

a. attaching a first one of said sections to said bottom portion to constitute a sub-assembly therewith, said bottom portion being hollow;

b. filling said bottom portion with enough air to make said sub-assembly buoyant;

c. floating said buoyant sub-assembly and said platform to an assembly site;

d. flooding said hollow bottom portion at said assembly site with sufficient water to submerge said sub-assembly below said surface, said platform being formed with an aperture extending vertically therethrough;

e. aligning the submerged sub-assembly with said aperture;

f. expelling enough water from said bottom portion to make said sub-assembly buoyant until a part of said sub-assembly enters said aperture; and

g. securing the sub-assembly partly entered in said aperture to said platform while the platform floats at said site.

4,007,599

MARINE PLATFORM

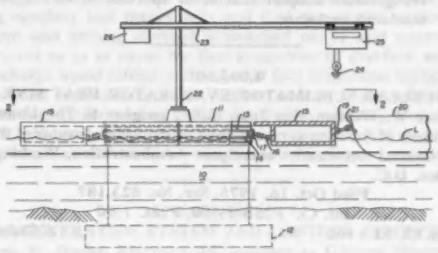
Robert L. Brown, 27594 Parkview Blvd., Warren, Mich. 48092

Filed Dec. 8, 1975, Ser. No. 638,353

Int. Cl.² B63B *21/00*; E02B *3/22*

U.S. Cl. 61—104 **6 Claims**

1. A marine platform comprising a stationary central platform having an upright axis, said platform having an uppermost portion of annular configuration, continuous annular guide means on said annular portion and a plurality of floating dock units arranged in a circle around said stationary central platform, flexible means movably engaged in said annular guide means and connected with said floating dock units, said flexible means positioning said floating dock units in closely



spaced relation to said annular guide means and said stationary central platform for free rotary movement thereabout and free vertical movement relative thereto.

4,007,600

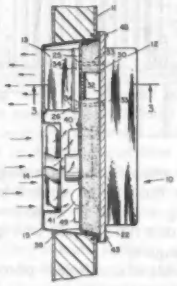
ICEBOX CONVERSION UNIT

Larry L. Simms, P.O. Box 1083, San Pedro, Calif. 90733

Continuation-in-part of Ser. No. 548,601, Feb. 10, 1975, abandoned. This application Apr. 2, 1976, Ser. No. 672,996

Int. Cl.² F25B *21/02*; F25D *3/08*

U.S. Cl. 62—3 **5 Claims**



1. A compact, self-contained refrigeration adapter unit for installation in any existing insulated enclosure comprising:

a heat-sink plate with heat-radiating fins on one side thereof,

a cold plate with heat-absorbing fins on one side thereof and defining a base and mounting means for said refrigeration adapter unit,

a thermoelectric module disposed between said plates,

a fan disposed for circulating air past said heat-radiating fins,

means for energizing said module and said fan,

thermal insulation material disposed between said plates to substantially completely fill the space therebetween,

an intermediate separator disposed to substantially enclose the space between said plates, said separator having a flange in contact with the edge of said cold plate, said separator extending to cover said insulation material and pass beneath said heat-sink plate, said separator having an opening for said module to pass through,

a cover disposed to nest over said intermediate separator and extend to enclose said fan and said heat-sink plate and said heat-radiating fins, said cover having a flange in contact with the flange of said separator, said cover having openings over said fan and over said heat-radiating fins to permit the circulation of air,

fastening means for fastening the flanges of said separator

and said cover to said cold plate to form a compact, self-contained refrigeration adapter unit, and

means for mounting said cold plate and the associated refrigeration adapter unit in an aperture in an existing insulated enclosure.

4,007,601

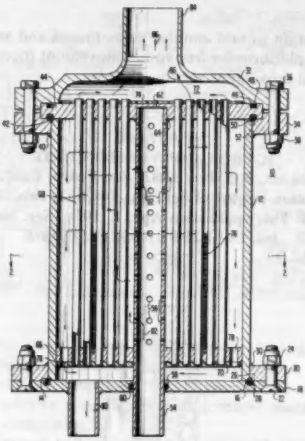
TUBULAR SUBLIMATOR/EVAPORATOR HEAT SINK

Bruce W. Webbon, San Jose, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Oct. 16, 1975, Ser. No. 623,187

Int. Cl.² F25B *19/00*; F28C *1/00*

U.S. Cl. 62—100 **8 Claims**



8. A method of cooling fluid comprising the steps of:

a. circulating the fluid to be cooled in a chamber, said chamber having a plurality of hollow porous heat exchangers such that fluid, liquid or vapor is absorbed by said heat exchangers;

b. coupling the inside of said hollow porous heat exchangers to a source of low pressure;

c. evaporating fluid absorbed and venting the resulting vapor;

d. allowing ice to form on said heat exchanger as a result of evaporation such that sublimation occurs across said heat exchanger;

e. maintaining the volume of fluid in said chamber to melt said ice while cooling fluid to the point where the ice melts; and,

f. repeating steps c through e repeatedly to cycle said cooling through evaporation and sublimation.

4,007,602

EXTERIOR ICE SERVICE FOR FREEZER-REFRIGERATORS

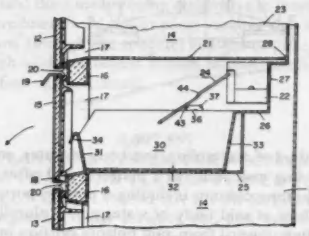
Richard D. Maxwell; John J. Pink; Michael J. Fitzharris, all of Cedar Rapids, and Louis R. Marz, Homestead, all of Iowa, assignors to Amana Refrigeration, Inc., Amana, Iowa

Division of Ser. No. 433,902, Jan. 16, 1974, Pat. No. 3,911,692. This application Sept. 8, 1975, Ser. No. 610,972

Int. Cl.² F25C *1/10*

U.S. Cl. 62—137 **1 Claim**

1. In a refrigeration unit having a food storage cabinet including freezing portions normally maintained at below freezing temperatures with vertically disposed front access openings, and ice apparatus disposed in one of the freezing portions, the ice apparatus including an automatic ice maker and an ice storage receptacle receiving ice manufactured by the ice maker, the combination therewith of a pair of vertically spaced, horizontally extending mullions forming a fixed part of the cabinet and defining one of said access openings, the storage receptacle being accessible through said one access opening; a panel having a lower edge portion hingedly secured along the lower mullion for swingable movement between a normally closed position in which the panel cooperates with the cabinet including the mullions to close said one access opening and an open position outwardly of the cabinet for access to the ice storage receptacle; the ice storage receptacle comprising a tray manually slidably movable on a shelf in said one freezing portion from a normal position therewithin out through said one access opening to a position at least partially outside of the cabinet after the panel is swung to its open position; and hinged door means having a normally closed position in which the door means cooperate with the cabinet including the mullions to close the remainder of the freezer access opening and movable to an open position for access to the remainder of the freezing portions; said ice maker including an ice level sensing arm movable from a



lower position in the tray when in its normal position to an upper position above the tray, and including means to deactivate the ice maker when the tray is moved to said outside position, the deactivating means comprising: a first pin carried by the exterior of a tray side wall and extending laterally toward an adjacent portion of the cabinet, a plate-like lever disposed between said tray side wall and said portion of the cabinet and pivoted to the latter about a horizontal axis normal to the plane of the lever, the lever including a seat in an edge thereof below the level of the pivot and receiving the first pin when the tray is in its normal position, the seat opening generally downwards through said edge to provide, a pair of opposed, diverging cam faces straddling the first pin, the first pin and one of the cam surfaces being effective to rotate the lever about its pivot in a second direction when the tray is returned to is normal position, and a second pin extending from the lever laterally across the top of said tray side wall and beneath the sensing arm when in its lower position, the second pin being disposed to engage and lift the sensing arm to its upper position when the lever is rotated in its first direction and to allow return of the sensing arm to its lower position when the lever is rotated in its second direction.

4,007,603

APPARATUS FOR DEFROSTING OF AN EVAPORATOR IN A HEAT PUMP

Berth Ulrik Gustafsson, Osterskar, Sweden, assignor to Projectus Industriprodukter AB, Stockholm, Sweden

Filed May 6, 1975, Ser. No. 575,037

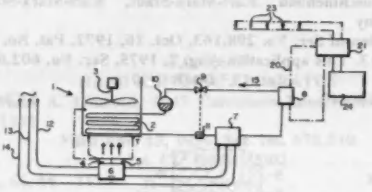
Claims priority, application Sweden, May 10, 1974, 74063165

Int. Cl.² F25D *21/06*; F25B *13/00*

U.S. Cl. 62—151 **3 Claims**

1. In a heat pump including a compressor for directing the flow of a heat transfer medium through said heat pump, said compressor being capable of reversing the direction of flow of the heat transfer medium through said heat pump, an evaporator, said evaporator including a fan and a heat exchanger to

which the heat transfer medium flows from said compressor, said fan arranged to drive air over said heat exchanger for indirect heat exchange with the heat transfer medium flowing through said heat exchanger, the exterior surface of said heat exchanger being subject to the accumulation of a frost or ice formation during operation of said heat pump, wherein the improvement comprises means associated with said compressor for reversing the direction of flow of the heat transfer medium through said heat pump, pressure sensitive means operatively connected to said reversing means for said compressor and said pressure sensitive means arranged to sense



the pressure differential of the air flowing over said heat exchanger and to compare it with a predetermined value so that the direction of flow of the heat transfer medium provided by said compressor can be reversed when the pressure differential reaches the predetermined value, and a temperature sensitive means located for sensing the temperature at the exterior surface of said heat exchanger, said temperature sensitive means operatively connected to said reversing means for said compressor for maintaining the reversed pumping direction of said compressor as long as the temperature at said heat exchanger is less than or equal to 0° C.

4,007,604

REFRIGERATOR UNIT, PARTICULARLY DUAL TEMPERATURE REFRIGERATOR

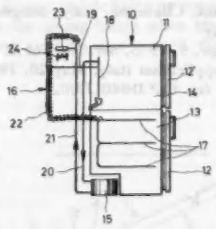
Jürgen Ballarin, Giengen, Germany, assignor to Bosch-Siemens Hausgerate GmbH, Stuttgart, Germany

Filed Feb. 18, 1976, Ser. No. 658,896

Claims priority, application Germany, Feb. 18, 1975, 2506750

Int. Cl.² F25B *41/00, 43/00*

U.S. Cl. 62—174 **3 Claims**



1. In a refrigeration unit with a heat-insulated housing and a refrigeration machine driven by a single compressor having a refrigeration cycle and provided with a condenser, a refrigerant metering capillary and refrigerant transfer lines with at least two evaporator sections disposed in series in the flow path of the refrigerant, the evaporator sections including a first section associated with a colder compartment and a second section associated with a warmer compartment, a connecting coolant line connecting said first evaporator section with said second evaporator section, a control element dependent on the temperature in said warmer compartment for intermittently activating said compressor, said control element being adapted simultaneously to activate a heating element for a refrigerant collector, said collector having a volumetric capacity equalling that of the second evaporator and being disposed before said refrigerant metering capillary, additional liquid refrigerant being dischargeable from said refrigerant collector into and through said refrigerant metering capillary and thence into said first evaporator section, when said heating element is switched on by said control element so as to cause the first evaporator to overflow and discharge liquid refrigerant from said first evaporator section into said second evaporator section, at least a part of said metering capillary being disposed in heat-conducting contact with said connecting coolant line connecting said first evaporator section with said second evaporator section.

4,007,605

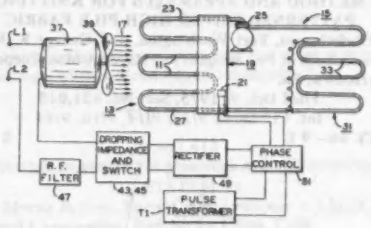
REFRIGERATION SYSTEM AND CONTROL CIRCUIT

Dann W. Denny, Morrison, Ill., assignor to General Electric Company, Fort Wayne, Ind.

Filed Feb. 10, 1975, Ser. No. 548,764

Int. Cl.² F25B *39/04*

U.S. Cl. 62—184 **19 Claims**



1. A refrigeration system for conditioning air in a space, a condensor generally isolated from the space and having a plurality of coils for passage therethrough of a refrigerant of the system, means operable generally at different speeds for flowing ambient air in a preselected flow path past the condensor so as to regulate the temperature thereof, means responsive to the temperatures of the condensor and the ambient air in the preselected flow path thereof for controlling the speed operation of the flowing means; the improvement wherein the controlling means includes a metallic member engaged in heat transfer relation across at least some of said condensor coils and disposed in heat transfer relation with the ambient air in the preselected flow path thereof generally downstream of said condensor with respect to said flowing means so as to attain a weighted average of the respective temperatures of said at least some condensor coils and the ambient air in the preselected flow path thereof downstream of said condensor, and means predeterminately disposed on said metallic member with respect to said at least some condensor coils and the preselected flow path of the ambient air downstream of said condensor for sensing the weighted average temperature.

4,007,606

HYDROGEN GAS EXTRACTOR

Fujita Yoshio, Mihara, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 17, 1975, Ser. No. 632,630

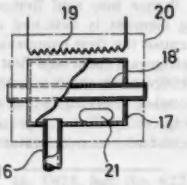
Claims priority, application Japan, Dec. 2, 1974, 49-136984

Int. Cl.² F25B *43/04*

U.S. Cl. 62—475 **8 Claims**

1. A hydrogen gas extractor adapted for use with a refrigerating machine in which a high vacuum is maintained and hydrogen gas is evolved largely by corrosive reactions of a solution, comprising a case, hydrogen gas exhaust means fabricated of palladium or its alloy and gastightly secured through the walls of said case, a connecting pipe communicated at one end with said machine and open at the other end

in said case, a mass of metal contained in said case, said metal being capable of occluding hydrogen gas at ordinary temperature and releasing the same at elevated temperature, and heater means for heating both said hydrogen gas exhaust means and said metal.

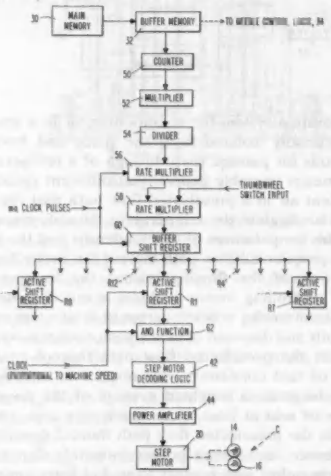


4,007,607

METHOD AND APPARATUS FOR KNITTING PATTERNED SLIVER HIGH PILE FABRIC

Paul Christiansen, Fort Washington, and George K. Roshon, Woxall, both of Pa., assignors to Hayes-Albion Corporation, Norristown, Pa.

Filed Oct. 9, 1975, Ser. No. 621,015
Int. Cl.² D04B *9/12, 9/14, 9/16, 9/44*
U.S. Cl. 66—9 B **8 Claims**



1. In a sliver high pile fabric circular knitting machine having a rotatable circle of independent needles, a plurality of sliver feeding cards spaced about the circle of needles, needle selecting mechanism associated with each card and a yarn feed disposed adjacent selected cards,

a. electronic control means operable to cause the needle selecting mechanisms to select needles according to a predetermined needle pattern,

b. said control means including a memory for storing knitting pattern data only,

c. variable speed drive means associated with each card operable to deliver a sliver to each card at selected rates, and

d. a data calculating and transfer electronic circuit interposed between the memory and each variable speed drive means, for receiving knitting pattern data in digital form from the memory,

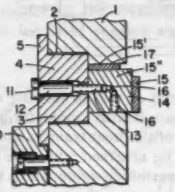
e. said data calculating and transfer electronic circuit including calculating means automatically operative to calculate continuously the speed of each variable speed drive means using the digital knitting pattern data transferred from the memory to the circuit and to regulate the rates of delivery of sliver to the cards, to harmonize sliver input to the knitting machine with the demand of the needles for sliver fibers according to the predetermined needle pattern.

4,007,608

CAM SYSTEMS FOR CIRCULAR KNITTING MACHINES

Harald Kürth, Mittweida; Dieter Laube, Frankenau, and Erich Berthold, Mittweida, all of Germany, assignors to VEB Wirkmaschinenbau Karl-Marx-Stadt, Karl-Marx-Stadt, Germany

Division of Ser. No. 298,163, Oct. 16, 1972, Pat. No. 3,926,013. This application Aug. 7, 1975, Ser. No. 602,607
Int. Cl.² D04B *9/00*
U.S. Cl. 66—40 **5 Claims**



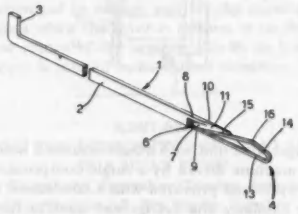
5. A cam system for a circular knitting machine comprising a cam retainer, cam carrier means movably mounted on said retainer, cooperating means on said retainer and cam carrier means effective to releasably secure said carrier means in a selected one of at least two positions relative to said container, a cam element having at least two cam surfaces, said cam element being mounted on said carrier means, cooperating means on said carrier means and said cam element effective to releasably secure said element in a selected one of at least two positions relative to said carrier in each of said positions of said element relative to said carrier only one of the cam surfaces being in an operative position and the others being in inoperative positions.

4,007,609

TWISTED BEARD NEEDLE

Luigi Omodeo Zorini, Cilavegna, Italy, assignor to Comez, S.p.A., Pavia, Italy

Filed Apr. 9, 1975, Ser. No. 566,278
Claims priority, application Italy, May 20, 1974, 22934/74
Int. Cl.² D04B *35/02*
U.S. Cl. 66—116 **2 Claims**



1. Twisted Beard needle for crochet frames, raschel, raschel chain and similar products comprising a rectangular stem, a heel on one end of said stem and a beard with the needle point of the beard bent towards the heel on the other end of said stem in a direction displaced on the side with respect to the longitudinal axis of the needle and in repose being positioned within the cross section of the rectangular stem, the portion of the beard bent towards the heel consisting of two segments inclined upwardly to a point extending above the cross section

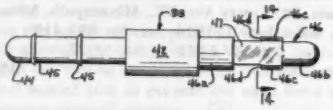
of the rectangular stem to form an obstacle to the loop which slides on the beard so that the loop is obliged to slack its sliding and to widen to overcome the abovementioned obstacle constituted by the point, said widening determining the recovery of the thread from the stitch previously formed to thereby tighten more said stitch.

4,007,610

HAND KNITTING APPARATUS

Lorraine A. Linstead, 4643 Cardamon Lane, Rockford, Ill. 61111

Filed Apr. 13, 1976, Ser. No. 676,510
Int. Cl.² D04B *35/02*
U.S. Cl. 66—117 **18 Claims**



1. A hand knitting apparatus comprising: a needle having a generally cylindrical body with a tip at one end and a coupling end remote therefrom; a elongate unit having a body with an outer diameter not greater than the cylindrical body of the needle and a coupling end removably connected to the coupling end of the needle; cooperative means at said coupling ends providing a disconnectable bayonet-type connection between the needle and elongate unit: the cooperative means including a male member on one of said coupling ends, and a female member on the other of said coupling ends: the male member including an axially elongate portion, and a prong thereon and extending radially therefrom a preselected distance; and the female member including an axially elongated internal socket sized to receive the elongate portion of the male member, an elongate groove at one side of the socket for the passage of the prong, and a recess angularly spaced from said elongate groove and defining an inwardly-facing shoulder against which the prong bears when the coupling ends are rotated after the prong has passed through the elongate groove.

4,007,611

YARN AND METHOD KNITTING SAME

Robert C. Blezard, Woonsocket, R.I., assignor to Smithfield Fibers, Inc., Lincoln, R.I.

Division of Ser. No. 83,588, Oct. 23, 1970, Pat. No. 3,748,874.
This application Apr. 16, 1973, Ser. No. 351,577
Int. Cl. D04b *21/00*
U.S. Cl. 66—195 **2 Claims**

1. A knitted yarn, comprising first and second strands alternately formed into successive stitches about a common axis, each stitch of said first strand including a loop that is formed by overlapping of portions of said first strand, each stitch of said second strand including a loop through which the loop of the first strand extends, said second strand including a first portion that interlocks with the loop of the next successive loop of the first strand, a second portion of the second strand interlocking with the loop of the first strand that extends through the loop of the second strand, said second portion of

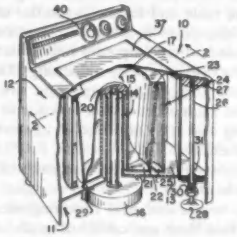
the second strand overlapping with said first portion thereof to form the loop of said second strand therewith.

4,007,612

WASHING MACHINE BALANCE AND SUSPENSION SYSTEM

Claude Morris Brimer, Tucson, Ariz., assignor to Linear International Corporation, Rancho La Costa, Calif.

Filed Aug. 18, 1975, Ser. No. 605,624
Int. Cl.² D06F *37/24*
U.S. Cl. 68—23.2 **10 Claims**



6. In a washing machine of the type having
a structural framework and an outer covering mounted thereto which together define a box-like casing having four vertical corners and a generally rectangular horizontal top surface with an access door hingedly positioned centrally therein and a substantially vertical control panel extending upwardly from the back thereof,
a vertically axially oriented clothes receiving tub rotatably mounted on said structural framework and enclosed by said outer covering; said tub including
a main tub portion including a bottom wall and an integral inclined frusto-conical sidewall for retaining fluid therein, an agitator portion centrally fixedly positioned therein;
an electric motor mounted to said framework;
drive means connecting said motor and said tub;
and an improvement comprising in combination:
a fluid retaining jacket surrounding said main tub portion and in fluid communication therewith for obtaining fluid extracted therefrom and retaining said fluid therein by centrifugal force to counteract loading imbalances in said tub during rotation of same; and
a plurality of vertically oriented flexible casing mounting

support bars, each being elongated, and including opposed top and bottom ends adapted for mounting to external members, each of said bars being rigidly mounted at its top end to said casing inwardly adjacent one of said vertical corners and top surface of said casing, extending substantially freely downwardly through frictional damping means on said casing; and including

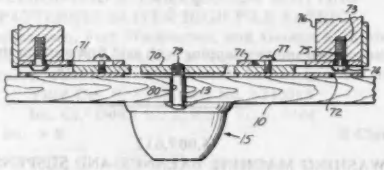
foot pads of resilient material mounted on its bottom end for providing frictional contact with a mounting surface for said washing machine.

4,007,613

EQUIPMENT SECURITY LOCKING DEVICE

James Scott Gassaway, 2356 Glendon Ave., Los Angeles, Calif. 90064

Division of Ser. No. 498,658, Aug. 19, 1974, Pat. No. 3,910,079. This application Aug. 1, 1975, Ser. No. 601,189
Int. Cl.² E05B 73/00
U.S. Cl. 70—58 6 Claims



1. In combination:

bar means adapted for placing on the upper surface of a table and for mounting on said bar means an equipment to be protected;

an anchor bolt having a head and a threaded shank, the head being adapted to be placed beneath the under surface of the table and the shank being adapted to pass through the table and fasten to the bar means;

lock means adapted to be placed against the under side of said table and to envelop said head, thereby preventing access to the bolt except by unlocking of said lock means;

said bar means comprising a strip and two hollow sleeves spaced from each other within which said strip is slidable;

means holding said strip and sleeves against sliding relative to each other; and

fastening means adapted to attach each of said sleeves to said equipment,

said holding means and said fastening means being positioned so that they are covered by the equipment, and thereby rendered inaccessible, when the equipment is mounted on, and attached to, said bar means,

whereby removal of the equipment from the bar means or the table is inhibited without unlocking said lock means.

4,007,614

LOCK FOR VEHICLES

Roger A. Schott, 13559 Rutland, Detroit, Mich. 48227, and Lawrence A. Schott, 15940 Warwick, Detroit, Mich. 48223

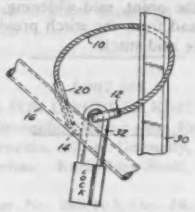
Filed Nov. 3, 1975, Ser. No. 628,395
Int. Cl.² B62H 5/00
U.S. Cl. 70—234 5 Claims

1. A conversion lock system for a tubular frame vehicle such as a bicycle which utilizes an elongate flexible member such as a cable or chain slidable into a hollow elongate frame member which comprises:

a. a short tubular member inserted through an opening in said frame member at an angle having one portion of one end jammed against an inner wall of said frame member opposite said opening and the other end projecting from said frame member,

b. a cable member threaded through said tubular member,

c. a withdrawal stop and a lock loop on said cable member, said stop and said loop having effective diameters larger than the inside diameter of said tubular member to prevent removal of said cable member, and



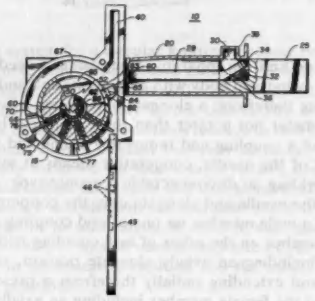
d. means interengaging said tubular member and said frame member to secure the tubular member in place.

4,007,615

KEY CONTROLLED PICK RESISTANT LOCK

Knut Nossum, 707 Lowry Ave. NE., Minneapolis, Minn. 55418

Filed June 1, 1976, Ser. No. 691,419
Int. Cl.² E05B 35/04, 63/22
U.S. Cl. 70—387 19 Claims

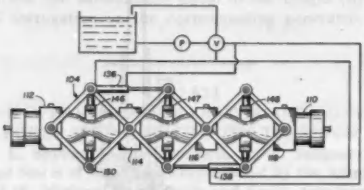


1. A lock mechanism operated upon insertion and removal of a key comprising, an enclosing housing and a transversely extending housing containing a latch therein, a shaft mounted in the first housing, an inner cylindrical member journaled on said shaft and having a plurality of spaced apertures therein, a hood carried by said shaft and encircling said inner cylindrical member, said hood having a window therein, an outer cylindrical member journaled on said hood and having a plurality of apertures therein with a spring biased pin mounted in each aperture; said pins being slidably positioned through said outer cylindrical member and adapted to engage the apertures in the inner cylindrical member through said window in said hood; a keyway in said first housing; a key having a surface with a plurality of sequential indentations therein which when inserted into the keyway engage the exposed ends of the pins in the outer cylindrical member to rotate the outer cylindrical member urging said pins into engagement with the apertures with the inner cylindrical member to rotate the inner cylindrical member simultaneously therewith; means included in the inner cylindrical member and the shaft to prevent rotation of the inner and outer cylindrical members in the event the apertures in the key do not cause predetermined engagement of the pins with the inner cylindrical member; means included in part in said enclosing and in part in said outer cylindrical member to prevent rotation of the outer cylindrical member except in a predetermined time sequence with the insertion of said key; and means included in part in said inner cylindrical member and in part with the latch to cause operation of the latch upon complete insertion of the key and subsequent withdrawal of the key.

4,007,616
CYLINDRICAL CONTAINERS BY HOUR GLASS FORMATION OF METAL TUBES

Benjamin J. Aleck, Jackson Heights, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Nov. 6, 1975, Ser. No. 629,648
Int. Cl.² B21D 31/00
U.S. Cl. 72—38 21 Claims

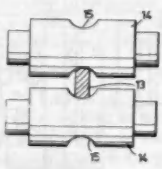


1. The method of making cylindrical containers comprising:
mounting a metal tubular stock within holders so as to localize a cylindrical area for axial tensile forces and heating;
heating the tubular stock cylindrical area while creating an inert atmosphere by applying a vacuum and/or inert gas within the tubular stock, especially at the original cylindrical heated area to prevent the need for a subsequent oxidation removal process;
pulling, while heating and creating the inert atmosphere, the tubular stock to impart local tension in the heated cylindrical area to reduce the stock diameter and thickness thereat.

4,007,617
METHOD OF ROLLING METAL BLANKS

Curt Gunnar Falk, Stockholm; Per-Olof Strandell, Taby; Per Erik Albrecht, Bromma, and Goran Anders Wallner, Hagfors, all of Sweden, assignors to AB Metalform, Stockholm, Sweden

Filed Oct. 17, 1975, Ser. No. 623,507
Claims priority, application United Kingdom, Sept. 23, 1975, 38910
Int. Cl.² B21B 1/12
U.S. Cl. 72—234 7 Claims

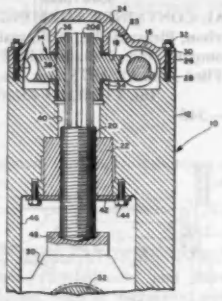


1. A method of reducing a metal blank by rolling in a plurality of passes, comprising rolling the blank successively through two types of alternating, sequentially arranged passes, of which passes each of one type of pass comprises flat-rolling said blank to a width-height ratio of 2 – 6 in at least one pair of rolls having substantially smooth roll barrels, and each of the other type of pass comprises upset-rolling said blank to a height-width ratio of 1.5 – 3.5 in at least one pair of rolls having open grooves exhibiting a rounded groove bottom and a width of 1.5 – 3.5 times the width of the blank to be upset-rolled.

4,007,618
RETROFIT METHOD AND APPARATUS FOR ROLLING MILLS

Robert J. Ponter, Glenshaw, Pa., assignor to Ritter Engineering Company, Pittsburgh, Pa.

Filed Mar. 22, 1976, Ser. No. 669,171
Int. Cl.² B21B 31/32
U.S. Cl. 72—245 16 Claims



1. A method of retrofitting a hydraulic roll actuating mechanism in a screw-down rolling mill of the type including a frame having a housing element mounted thereto for enclosing screw drive means operably connected to a screw member extending through an opening in said frame toward the roll members of said mill, said screw member being threadedly engaged with a rotationally fixed screw nut carried by said frame, comprising (a) providing and fitting a hydraulic cylinder to said frame adapted to be mounted thereon in replacement of said housing element; (b) providing and inserting an externally threaded piston rod sleeve into said opening, said sleeve being coaxially secured to said hydraulic cylinder and threadedly engaged with said screw nut; and (c) providing and disposing a hydraulic piston in said hydraulic cylinder, said hydraulic piston including a piston rod extending through said sleeve and arranged for operating the roll members of said mill in replacement of said screw member.

4,007,619
CONTAINER FOR AN EXTRUSION PRESS

Adolf Ames, Hilzingen, and Alfred Wagner, Steisslingen, both of Germany, assignors to Swiss Aluminium Ltd., Neuhausen am Rheinfall, Switzerland

Filed Apr. 4, 1975, Ser. No. 564,997
Claims priority, application Germany, Apr. 11, 1974, 2417815
Int. Cl.² B27B 27/00; B23K 31/06
U.S. Cl. 72—272 8 Claims

1. A container for an extrusion press for use in an extrusion process, comprising:
a liner space having its shape defined by at least one liner wall;

said liner wall having at least one groove defined in a predetermined part thereof at which high stresses during the extrusion process are expected and extending in the direction of extrusion; and

a weld joint disposed in said groove filling and sealing it; said weld joint being elastic during the extrusion process.

4,007,620

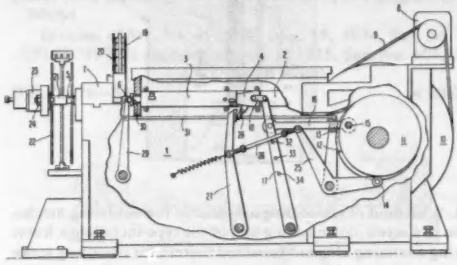
METAL CONTAINER FORMING APPARATUS

Joseph J. Urban, Pleasantville, N.Y., assignor to Crown Cork & Seal Company, Inc., Philadelphia, Pa.

Filed June 11, 1975, Ser. No. 586,023

Int. Cl.² B21D *45/00*

U.S. Cl. 72—345 **18 Claims**



1. In an apparatus for forming drawn and ironed containers and including a reciprocating ram for urging container blanks through at least one annular die, means for aiding in stripping formed containers from said ram comprising:

a stripper punch comprising an elongate rigid stem extending within said ram and having an enlarged head portion adapted to seat against one end of the ram;

a carriage reciprocally guided within said apparatus and carrying said ram;

a toggle member pivotally coupled to said carriage and having a first end coupled to said stripper punch and a second end;

a planar cam element rotatable about a stationary axis in synchronism with the reciprocation of said ram; and

an intermediate link mounted to pivot upon a stationary axis and reciprocally operated by said cam element and contacting said second end of said toggle member for maintaining said stripper punch in an advanced position as said ram retreats from said position to allow said ram to withdraw from within a formed container.

4,007,621

CONTAINERS

Jozef Tadeusz Franek, Chorelywood, and Paul Porucznik, St. Albans, both of England, assignors to The Metal Box Limited, Reading, England

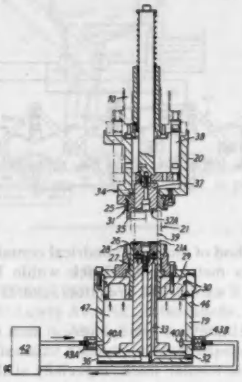
Filed May 6, 1975, Ser. No. 574,966

Int. Cl.² B21D *22/08*, *24/08*

U.S. Cl. 72—351 **18 Claims**

1. A single action cam operated press comprising two end frames in spaced relationship to each other, an axle spanning the distance between said end frames, means for rotating said axle, said axle having fixed thereto a tool bolster and a turret in axial spaced relationship to each other, said tool bolster carrying a plurality of first tools, a plurality of rams disposed for reciprocal motion parallel to said axle, a plurality of guide ways defined by said turret for guiding the reciprocal motion of said rams, a drum cam means fixed to a first of said end frames remote from said tool bolster, each ram having at an end thereof adjacent said first end frame a follower in contact with said drum cam means, each ram having at an end thereof adjacent said tool bolster a second tool with pairs of said first and second tools being in axial alignment, preloaded tie bars extending between said end frames to maintain said end frames in spaced relationship and said drum cam means in spaced axial relationship to said tool bolster and said turret, said drum cam means being operative during rotation of said tool bolster, turret and rams to move said rams in a sequence of motion including

a. impact free engagement of a workpiece between said first and second tools followed by



b. a workpiece forming operation beginning at zero velocity of said rams at controlled acceleration and terminates with controlled deceleration followed by

c. a return stroke of said rams of greater linear velocity than the forming operation, and

d. said return stroke includes at least one period of deceleration during which the formed article is stripped from the punch.

4,007,622

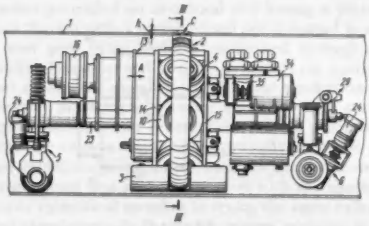
DEVICE FOR BENDING THIN-WALLED PIPES

Abram Isaevich Galperin, 7 Parkovaya ulitsa, 25a, korpus 21, kv. 25; Lev Vladimirovich Vishnyakov, 3 Frunzenskaya ulitsa, 13, kv. 86; Boris Vladimirovich Pokrovsky, Schelkovskoe shosse, 81, kv. 94; Vladimir Ioganovich Kalganov, ulitsa Scherbakovskaya 57/20, kv. 277; Boris Borisovich Vasiliev, Khorovodny proezd, 20, kv. 51, and Igor Nikolaevich Kotikov, ulitsa Textilschikov, 2/20, kv.8, all of Moscow, U.S.S.R.

Filed May 1, 1975, Ser. No. 573,514

Int. Cl.² B21D *9/14*

U.S. Cl. 72—393 **5 Claims**



1. A device for bending thin-walled pipes by embossing them with eccentric corrugations (C), comprising: an expander block (2) introducible into a pipe (1) to be bent, to the point of the desired bend, and being formed by a supporting shoe (3) and a punch (4), the latter being installed on the former, with provision for positive motion relative to said block in the course of the bending radially to the pipe surface, for making the desired corrugation on the pipe, the corrugation being eccentric to the pipe axis, and for thus bending the

pipe; said punch having the shape of a ring in a cross-sectional plane of the pipe, being open at the side of said shoe and composed of individual punch elements (7) around the circumference of said punch; power cylinders (10) whose axis are arranged radially to a cross-sectional plane of the pipe, having movable members (9) that are respectively articulated to said punch elements while having stationary members (10) connected with said shoe; said movable members making strokes that are substantially equal to the height (h) of the desired corrugation on the corresponding generatrix of the pipe.

4,007,623

SPRING OPERATED ACCELERATOR AND CONSTANT FORCE SPRING MECHANISM THEREFOR

George L. Shillinger, Jr., Campbell, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Oct. 24, 1975, Ser. No. 625,732
Int. Cl.² G01N 3/32
U.S. Cl. 73—12 9 Claims

1. Apparatus for applying acceleration to a body comprising a carriage for supporting the body, means for constraining said carriage for movement on a linear path, a spool supported for rotation on an axis adjacent and perpendicular to said path, a spirally biased spring circumscribing said spool and having a distal extremity, and means for attaching said distal extremity to said carriage so that when said carriage is displaced along said path in a direction away from said spool, a first portion of said spring is straightened into approximate parallelism with said path, a second portion of said spring circumscribes said spool, and a transition region intermediate said first and second portions is curvilineally deformed so as to apply a force tending to accelerate said carriage toward said spool, said spring including a plurality of segments, each said segment having a different force producing capability to afford acceleration of said carriage at a varying magnitude along said path.

4,007,624

ELECTRONEGATIVE GAS DETECTION TECHNIQUE

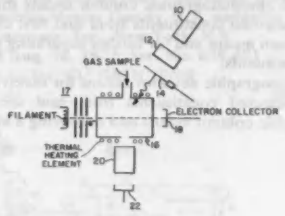
Peter J. Chantry, and Cheng-Lin Chen, both of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 2, 1975, Ser. No. 592,857
Int. Cl.² G01N 27/62
U.S. Cl. 73—23 10 Claims

1. A method for improving the sensitivity of electronegative gas detection techniques employing a dissociative electron attachment process, comprising the steps of,

introducing electrons into a gas, said electrons having a suitable energy for attachment to molecules of interest within said gas,

exciting molecules of interest to a vibrational or electronic level sufficient to increase the cross section of the molecules of interest for dissociative attachment by the electrons to produce negative ions indicative of the molecules of interest, and



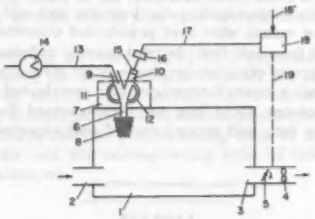
measuring the negative ions as an indication of said molecules of interest.

4,007,625

FLUIDIC OSCILLATOR ASSEMBLY

Heinz Houben, Monchen-Gladbach, and Manfred Pabst, Weiden near Cologne, both of Germany, assignors to A. Monforts, Monchen-Gladbach, Germany

Filed July 14, 1975, Ser. No. 595,481
Claims priority, application Germany, Oct. 12, 1974, 2448783; July 13, 1974, 2433765
Int. Cl.² G01N 9/00
U.S. Cl. 73—23 5 Claims



1. A fluidic oscillator assembly comprising a fluidic oscillator having an inlet and two outlets, and a piezoelectric element for detecting frequency of oscillations induced in said fluid oscillator, said piezoelectric element being located at and closing one of said outlets of said fluidic oscillator.

4,007,626

CHROMATOGRAPHIC ANALYSIS

Lewis B. Roof, Bartlesville, Okla., and Donald D. DeFord, Glenview, Ill., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 18, 1975, Ser. No. 569,437
Int. Cl.² G01N 31/08
U.S. Cl. 73—23.1 11 Claims

1. Chromatographic analysis apparatus comprising:

an unpacked tubular vaporizer column means for vaporizing at least a portion of a liquid sample material introduced thereinto, said vaporizer column means having a first end and a second end;

means for providing a flow of a gaseous carrier fluid stream into said first end of said vaporizer column means;

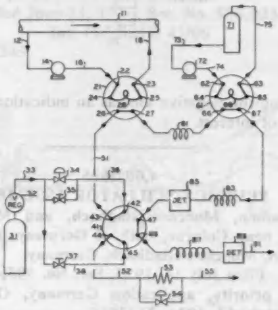
first valve means for introducing a preselected volume of said liquid sample material into said carrier fluid stream flowing into said first end of said vaporizer column means;

first chromatographic column means in fluid communication with said second end of said vaporizer column means for at least partially separating preselected constituents of the vaporized sample material passing therethrough and

for delaying the passage of vapors of a solvent liquid therethrough until the passage of all said preselected constituents therethrough has been completed;

second chromatographic column means for receiving said preselected constituents from said first chromatographic column means and for further separating said preselected constituents;

chromatographic detector means for receiving each of said preselected constituents from said second chromatographic column means and delivering a signal responsive



to the amount of each said preselected constituent passing therethrough;

third valve means for reversing the flow of fluid through said first chromatographic column means and said vaporizer column means after said preselected constituents have passed from said first chromatographic column means to said second chromatographic column means; and

second valve means for introducing a preselected volume of said solvent liquid into the thus reversed fluid stream flowing into said second end of said vaporizer column means.

4,007,627

DENSITY TRANSDUCERS

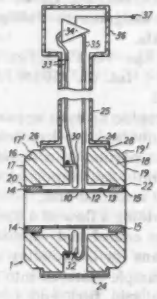
James Woolryche Stansfeld, Beech, near Alton, England, assignor to The Solartron Electronic Group Limited, Hampshire, England

Filed Sept. 18, 1975, Ser. No. 614,574

Claims priority, application United Kingdom, Sept. 21, 1974, 41208/74

Int. Cl.² G01N 9/00

U.S. Cl. 73—32 A **11 Claims**



1. A density transducer for producing an output signal representative of the density of a fluid, comprising a hollow circumferentially vibratable cylinder arranged so that the fluid can come into contact with only one of its internal and external surfaces, means for exciting and maintaining circumferential resonant vibration of the cylinder and for producing an output signal representative of the frequency of said vibration, and means responsive to the pressure of the fluid to apply a compressive axial force dependent upon said pressure to the cylinder, whereby to reduce the effect of variations of the pressure of the fluid on the frequency of said vibration.

4,007,628

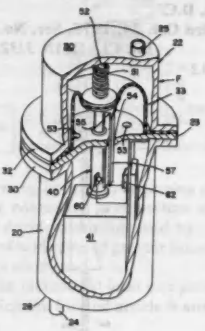
REMOTE FLOW TRANSDUCER FOR COMMUNICATION CABLE

Leslie Worcester, Los Altos, Calif., assignor to Mark Systems, Inc., Sunnyvale, Calif.

Filed Nov. 1, 1974, Ser. No. 520,192

Int. Cl.² G01M 3/28; G01F 1/38

U.S. Cl. 73—40.5 R **10 Claims**



1. Apparatus for remotely monitoring air flow at a central station to the interior of a remotely located cable sheath surrounding a plurality of communication conduits, said apparatus comprising: a source of dehumidified air; an air conduit between said source of dehumidified air and the interior of said cable sheath for supplying dehumidified air to the interior of said sheath, a flow meter inserted in said air conduit proximate said sheath for passing at least part of the air there through to said sheath, said flow meter including a housing having an inlet for receiving at least part of said air, an outlet for discharging at least part of said air, and a biased diaphragm mounted for movement with respect to said housing responsive to changes in flow of said dehumidified air from said conduit to said cable sheath, and wherein said diaphragm comprises a flexible member rigidly attached to said housing at at least one portion, and movable within said housing responsive to air flow at another portion, means for defining an aperture in said diaphragm, a tapered member mounted to said housing and contacting with said aperture for defining changing air flow areas between said inlet and outlet upon changing concentric movement of said aperture over said tapered member responsive to changes in fluid flow between said inlet and outlet; a member having variable optical density within said meter operatively attached to said diaphragm for relative movement to said meter with said diaphragm responsive to fluid flow; a light source in said flow meter on one side of said member of variable optical density; a photo sensor on the other side of said member of variable optical density for receiving from said light source a signal proportional to the diaphragm actuated movement of said member of variable optical density; at least a pair of electrical conduits extending between said central station and said flow meter; means for remotely monitoring and powering said light source and photo sensor through said pair of electrical conduits; means for connecting said photo sensor across said pair of electrical conduits to impart between said conduits said signal proportional to the diaphragm actuated movement of said member of

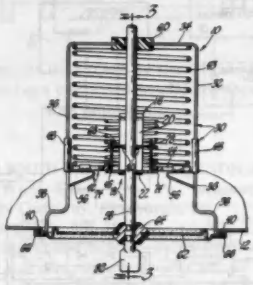
variable optical density; and meter means at said central power station connected across said electrical conduits for reading said proportional signal.

4,007,629

METHOD AND APPARATUS FOR MONITORING OIL DEGRADATION

Peter A. Hochstein, 14020 15 Mile Road, Sterling Heights, Mich. 48077

Filed Nov. 4, 1975, Ser. No. 628,810
Int. Cl.² G01N 33/30
U.S. Cl. 73—53 49 Claims



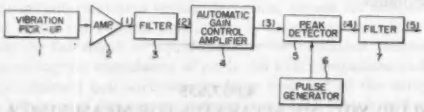
1. An apparatus for monitoring the degradation of oil comprising; first sensing means for producing an exponential output in response to oil temperature and the time the oil is subjected to the temperature, second sensing means for producing an additive output reflecting the number of occurrences the oil is heated without reaching a predetermined temperature, and summing means for producing a summation of said outputs.

4,007,630

DEVICE FOR DETECTING DAMAGE ON ROTATORS

Banda Noda, Tokyo, Japan, assignor to Nippon Seiko K.K., Tokyo, Japan

Filed July 9, 1975, Ser. No. 594,251
Claims priority, application Japan, July 12, 1974, 49-79111
Int. Cl.² G01M 13/04, 15/00
U.S. Cl. 73—71.4 3 Claims



1. A device for detecting damage on a rotator by converting into electric signals the mechanical oscillation or sound produced when sai rotator is rotated, and evaluating the amplitude of the electric signals originating from the presence of damage on the rotator manifested as an impulsive oscillation having a period dependent upon the rate of rotation of said rotator, said device comprising:

a peak detector for detecting the peak value of said electric signals and holding that value as a DC level,

a reset pulse generator for generating reset pulses having a predetermined pulse repetition rate to reset said peak detector at a predetermined time interval, the repetition rate of the reset pulses being predetermined so that said peak detector repeats at least twice the cycle of peak detecting, holding sand resetting during one period of said impulsive oscillation, and

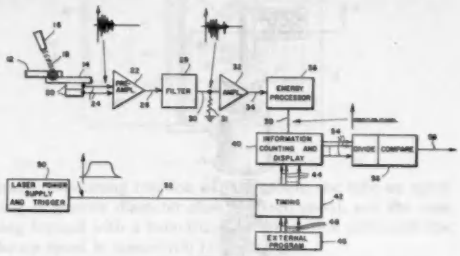
means for deriving an output signal from said peak detector.

4,007,631

METHOD AND APPARATUS FOR EVALUATING WELDS USING STRESS-WAVE EMISSION TECHNIQUES

Mansoor Ali Saifi, and Sotirios John Vahaviolos, both of East Windsor Township, Mercer County, N.J., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Aug. 18, 1975, Ser. No. 605,481
Int. Cl.² G01N 29/00
U.S. Cl. 73—71.4 10 Claims



1. A method for the real-time, non-destructive evaluation of a weld using stress-wave emission techniques, comprising the steps of:

a. dividing a weld cycle into n intervals of time where $n \geq 4$, each interval corresponding to a different aspect occurring in the weld area during said weld cycles;

b. measuring stress-wave energy emitted from the weld area during each of said intervals;

c. forming ratios of the measured stress-wave energies between at least two of said time interval measurements; and

d. determining the acceptability of a particular weld by comparing the measurements obtained for said n time intervals and the ratios thereof with a set of predetermined acceptable ranges for measurements selected from any combination of corresponding ones of said n time intervals and the corresponding ratio of said interval measurements.

4,007,632

APPARATUS FOR DETERMINING THE TEXTURAL QUALITIES OF FOOD

Ronald A. Segars, Hopkinton, Mass., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 29, 1976, Ser. No. 653,418
Int. Cl.² G01N 3/24
U.S. Cl. 73—78 6 Claims

1. In an apparatus for evaluating the textural characteristics of a food product of the type comprising a rod-like food penetrating punch means and means for applying a compression or penetration force to said food product through said punch means and for measuring said force, said punch means being detachably attached to the compression or penetration force applying component of said means for applying a compression or penetration force and for measuring said force, the improvement comprising means for supporting a slice of said food product in a substantially horizontal plane substantially perpendicular to the central axis of said punch means, said food slice supporting means comprising a shear plate, a hollow cylindrically-shaped shear plate support, a solid circularly-shaped protection disk on which said shear plate support rests and to which said shear plate support is detachably attached, a support base means for supporting said protection disk in a substantially horizontal plane and an adapter means conformed to mate with said support base means so as to maintain said support base means, said protection disk, said shear plate support, and said shear plate properly oriented relative to said punch means, said adapter means being detachably attachable to a lower vertically movable or stationary element of said

compression or penetration force applying and measuring means, said shear plate being detachably attachable to the upper portion of said shear plate support and having a circularly-shaped die passing vertically through said shear plate with its central vertical axis coinciding with the central vertical axis of said shear plate, said circularly-shaped die having a diameter less than but not more than about 0.01 cm less than the diameter of said punch means, said punch means having a substantially planar face on its lower end, said punch means

and said shear plate being oriented so as to cooperate whereby said punch means enters into said circularly-shaped die while completing the punching of a plug from a slice of said food product being supported by said shear plate, the force measuring component of said means for applying a compression or penetration force and for measuring said force measuring and recording the force being applied by said punch means to said food product as said punch means punches said plug from said slice of food product.

4,007,633

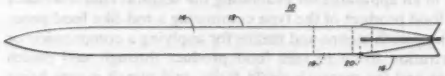
METHOD OF DETERMINING THE PHYSICAL CHARACTERISTICS OF A SEA FLOOR

John R. Thompson, Camarillo, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 14, 1975, Ser. No. 621,714

Int. Cl.² G01N *3/30, 3/48*

U.S. Cl. 73—84 **4 Claims**



1. A method of determining the physical characteristics of the sea floor comprising the steps of:

a. providing a body of known size, weight, and shape capable of generating and transmitting acoustical signals;

b. releasing said body into the sea such that said body descends in free fall until it strikes and penetrates the sea floor coming to rest therein;

c. directing said acoustic signals substantially vertically upward from said body;

d. receiving said acoustic signals in receivers disposed near the sea surface; and

e. generating from said received acoustic signals, utilizing the doppler effect, a direct-current analog signal which is a function of the velocity of said body from a time immediately preceding said body's striking the sea floor surface until said body comes to rest in the sea floor, thereby obtaining an indication of the physical characteristics of the sea floor.

4,007,634

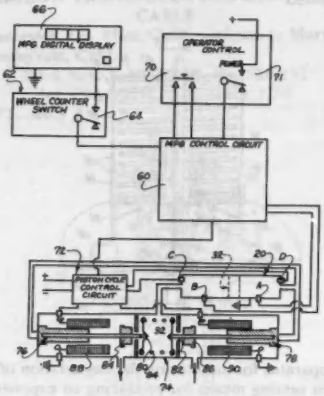
FUEL RATE MONITOR APPARATUS FOR VEHICLES

William R. Alban, R.R. No. 1, Galena, Ohio 43021

Filed Oct. 28, 1975, Ser. No. 625,946

Int. Cl.² G01F *9/00*

U.S. Cl. 73—114 **18 Claims**



1. A digital fuel rate monitor apparatus for vehicles comprising, in combination, control circuit means including signal producing means for producing signals proportional to units of fuel flow volume and units of distance of vehicle travel and for relating such units to effect a single digital readout in miles per gallon; a positive displacement flow volume metering means mountable in said fuel flow for measuring fuel flow in small digital units of volume and for delivering fuel flow signals to said control circuit means; and vehicle travel measurement means for measuring vehicle travel in small digital units of distance occurring during a measured fuel flow volume, said measurement means being connected to said control circuit means for delivering distance traveled signals thereto, said flow volume metering means including a metering cylinder for receiving said flow, a position revealing piston mounted for reciprocation in said cylinder, and a low-friction peripheral seal on said piston and engaging the inner wall of said metering cylinder.

4,007,635

FLUID VOLUME APPARATUS FOR MEASURING A FLUID UNDER PRESSURE

Eberhard Friebel, Berlin, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed June 23, 1975, Ser. No. 589,002

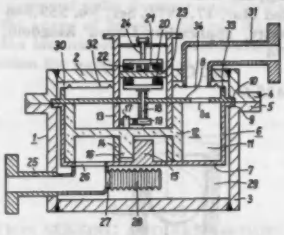
Claims priority, application Germany, June 28, 1974, 2431751

Int. Cl.² G01F *3/08, 15/14*

U.S. Cl. 73—273 **7 Claims**

1. In a fluid-volume apparatus for measuring fluid flow under pressure having a pressure-resistant housing, a measuring chamber housing arranged within the outer housing so as to conjointly define therewith a space, and a fluid medium contained within said space, inlet and outlet ducts being provided to supply said fluid under pressure to and remove it from said measuring chamber housing, said inlet and outlet ducts passing through said outer housing, the improvement comprising: pressure-responsive means interposed between the fluid

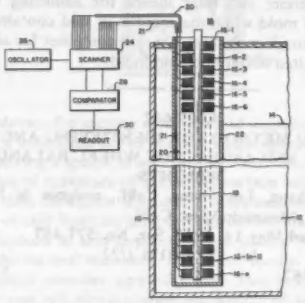
to be measured and the fluid medium in said space thereby enclosing said space, said pressure-responsive means equalizing the pressures developed by the fluid to be measured and said fluid medium contained in said enclosed space.



4,007,636
LIQUID METAL LEVEL INDICATOR

Martin H. Wahl, Evans City, Pa., assignor to Mine Safety Appliances Company, Pittsburgh, Pa.

Continuation of Ser. No. 392,965, Aug. 30, 1973, abandoned.
This application Mar. 4, 1975, Ser. No. 555,146
Disclosure was also published under second Trial Voluntary Protest Program on Apr. 20, 1976
Int. Cl.² G01F *23/26*
U.S. Cl. 73—290 R **2 Claims**



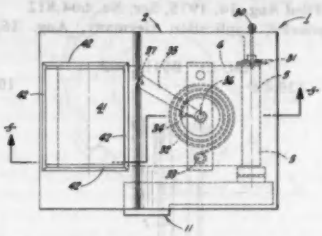
1. A liquid metal level indicator comprising a plurality of substantially identical unshielded coils, means for supporting said coils in a vertical coaxial array extending over substantially the full depth of liquid metal to be measured, means for comparing the impedance of each coil to the impedance of the next adjacent coil successively from one end of the array to the other, and a common magnetic core on which said coils are supported.

4,007,637
DISPOSABLE-TYPE TEMPERATURE RECORDER

George Nakagawa, and Robert M. Nakagawa, both of 1812 Dakota Ave., Modesto, Calif. 95351

Filed Mar. 11, 1976, Ser. No. 666,043
Int. Cl.² G01K *5/70*
U.S. Cl. 73—343.5 **7 Claims**

1. A temperature recorder comprising a case, a feed spool and a take-up spool rotatably mounted in the case in spaced, parallel relation, a tape wound on the feed spool and extending therefrom to connection with the take-up spool, motor means connected to the take-up spool and acting to rotate the same in a direction to cause the tape to travel from the feed spool and wind onto said take-up spool, a temperature-responsive device mounted in the case and including a movable stylus having means to scribe on the tape at a point between the spools, a speed-control device arranged in connection with at least one of the spools and operative to govern the speed of travel of the tape between said spools, and releasable means

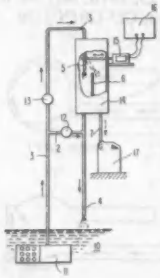


initially preventing rotation of said spools; the take-up spool being of greater diameter than the feed spool, and the case being formed with a cylindrical portion which surrounds the take-up spool in concentric relation.

4,007,638
LIQUID SAMPLING

Malcolm F. Irwin, West Chester, and Charles A. McClure, Malvern, both of Pa., assignors to Pro-Tech Inc., Malvern, Pa.

Filed Sept. 29, 1975, Ser. No. 617,649
Int. Cl.² G01N *1/18*
U.S. Cl. 73—421 A **12 Claims**



1. In liquid sampling wherein liquid is withdrawn from a body of liquid being sampled to flow past an intermittent diversion locus and back to the body of liquid or to waste except when being diverted from such locus to a collection location, the improvement in providing a plurality of separate samples simultaneously comprising passing the flow of liquid through a first temporarily confining region having a plurality of outlets therefrom, separately flowing streams of liquid from the respective outlets into a second temporarily confining region and past loci of intermittent diversion and back to the body of liquid or to waste except when being diverted, intermittently diverting each such stream at its diversion locus to the collection location, and collecting them as individual samples thereat.

4,007,639

CAPILLARY VESSEL FOR BLOOD REMOVAL

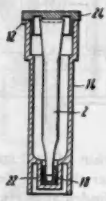
Rainer Haeckel, Hannover, Germany, assignor to Firma Walter Sarstedt Kunststoff-Spritzgusswerk, Numbrecht, Rommelsdorf, Germany

Filed Aug. 14, 1975, Ser. No. 604,812

Claims priority, application Germany, Aug. 16, 1974, 2439218

Int. Cl.² B01L 3/02

U.S. Cl. 73—425.4 P 10 Claims



1. Capillary vessel for extracting very small quantities of blood, wherein the nozzle is in the form of a capillary tube, while the remaining region is widened such that a micropipette can be inserted therein, and at least the end of the nozzle is closable by means of a plug.

4,007,640

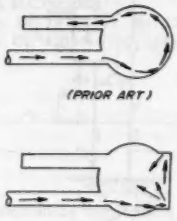
SAMPLING APPARATUS

Joseph J. Boron, Medina, Ohio, assignor to Aikoh Co., Ltd., Tokyo, Japan

Filed Jan. 23, 1976, Ser. No. 651,710

Int. Cl.² G01N 1/20

U.S. Cl. 73—425.4 R 17 Claims



1. Apparatus for taking a sample from a flowing stream of molten metal comprising:

container means defining a mold cavity having a mold chamber and a pin chamber communicating with each other for receiving a sample quantity of said molten metal and forming a mold chamber sample and a pin sample;

a sample tube communicating with said mold chamber and having an open end adapted to be placed in said stream of molten metal for supplying said metal to said tube and chambers;

said mold chamber, pin chamber and sample tube defining a flow path;

means in the flow path for substantially equalizing the carbon content of the pin sample and the mold chamber sample.

4,007,641

MOLTEN METAL SAMPLER WITH VACUUM

Edward A. Kelsey, Disley, England, assignor to Robert C. Collins, Ashippun, Wis.

Filed Mar. 17, 1975, Ser. No. 559,046

Claims priority, application United Kingdom, Mar. 20, 1974, 12363/74

Int. Cl.² G01N 1/12

U.S. Cl. 73—425.6 16 Claims

1. In a molten metal sampler; a container adapted to be mounted at the end of a probe; a mold in said container for receiving the sample of molten metal; means permitting the flow of air between the interior of said mold and said container but preventing the flow of molten metal out of said mold; air tight sealing means for sealing said container so that the atmosphere can be evacuated from said container as well as from the mold in said container and the vacuum can be maintained therein; and filler means for admitting molten metal into said mold while the mold is in said container and while the vacuum is maintained in said container for assisting the flow of molten metal into said mold.

4,007,642

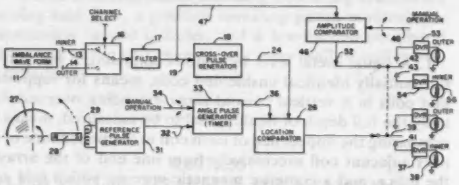
SYSTEM AND METHOD FOR IDENTIFYING ANGULAR LOCATION AND AMOUNT OF WHEEL BALANCING WEIGHTS

Bernie F. Jackson, Los Gatos, Calif., assignor to Nortron Corporation, Mountain View, Calif.

Filed May 14, 1975, Ser. No. 577,457

Int. Cl.² G01M 1/22

U.S. Cl. 73—462 3 Claims



1. In a system for detecting the angular locus for weights to be secured to a rotatable body in balancing the body means for electronically monitoring unbalanced forces on the body to generate a periodic waveform thereof in which the wave crosses the zero amplitude axis in a negative going direction during the period thereof at an angular position wherein said weight should be added to the body, comprising means for generating a cross-over pulse in response to each negative going crossing of the zero axis, locus detecting means having two inputs, one of said inputs being operatively coupled to receive said cross-over pulses, means serving to sense each revolution of the body and to provide a reference pulse in response thereto, timer means responsive to said reference pulse for generating an angle pulse, said angle pulse forming said second input to said locus detecting means, lighting means coupled to said locus detecting means, said detecting means serving to detect when said signals are conjointly pre-

sent on said two inputs and serving to operate said lighting means from a first to a second condition responsive to the conjoint presence of said first and second inputs, means for varying the duration of said angle pulse from a first pulse duration to a second pulse duration until said second condition is on the verge of being achieved, the degree of said varying of the last named said means serving to define the angular position for weight to be added.

4,007,643

VIBRATION SENSING AND RESPONDING DEVICE

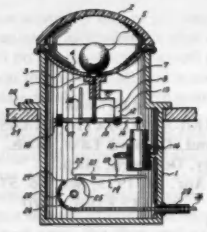
Yukio Matsushita, 202-5 Tsuchiyama, Hiraoka, Kakogawa, Hyogo, Japan

Filed June 6, 1975, Ser. No. 584,628

Claims priority, application Japan, Dec. 9, 1974, 49-141828; Dec. 9, 1974, 49-141829

Int. Cl.² G05G *17/00*

U.S. Cl. 74—2 **2 Claims**



1. A device for sensing vibration and responding thereto to actuate a utilization device, comprising a spherical ball, a ball saucer having a spherical inner surface for sustaining said ball, the radius of curvature of said inner surface being sufficiently greater than the radius of said ball, a depression formed in the bottom of said inner surface, a reciprocable member substantially disposed in said depression and placed just under said ball in the normal stationary condition, means of urging said reciprocable member upwardly such that said reciprocable member can not move against the weight of said ball in the normal stationary condition but can move upwardly to protrude from the inner surface of said ball saucer when said ball leaves said reciprocable member, and means for coupling said reciprocable member to said utilization device for actuating said utilization device in response to the vertical motion of said reciprocable member, said device further comprising a suspension weight suspended vertically by a spring to allow a vertical vibration, a kicking mechanism coupled to said suspension weight for displacing said ball in response to the vertical vibration of said suspension weight.

4,007,644

BELT

Ernest F. Weinberger, Ardsley, N.Y., assignor to SCM Corporation, New York, N.Y.

Filed Oct. 20, 1975, Ser. No. 623,691

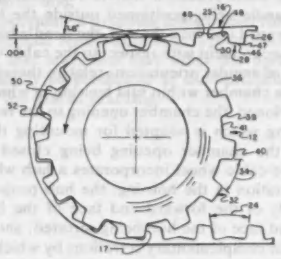
Int. Cl.² F16H *7/00*; F16G *1/28*

U.S. Cl. 74—229 **26 Claims**

1. A power transmitting toothed belt comprising:

means to provide a single tooth driving contact between the toothed belt and the pulley; and

means on the toothed belt including an apex between the



teeth to provide minimal contact between the tooth valleys of the belt and the teeth of the pulley.

4,007,645

OPERATOR MECHANISM

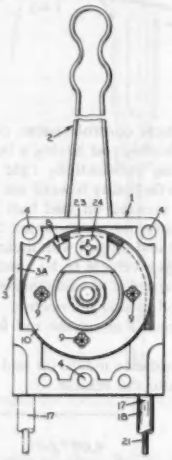
Ernest Baker Dove, Auckland, New Zealand, and James Frederick Hemens, Billericay, England, assignors to Teleflex Morse Ltd., Basildon, England

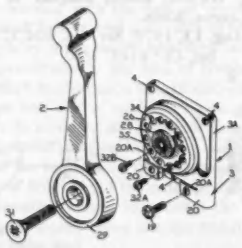
Filed Feb. 6, 1975, Ser. No. 547,676

Claims priority, application United Kingdom, Feb. 13, 1974, 6560/74

Int. Cl.² F16C *1/10*

U.S. Cl. 74—501 R **18 Claims**





1. An operator mechanism for translating the core of a cable having a casing guiding the core, comprising a cable wheel mounted for rotation inside a housing, the cable wheel being adapted for attachment of the core to a defined region

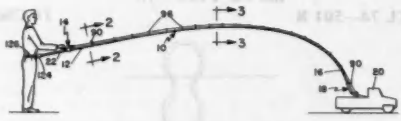
of the periphery thereof so that the core, when so attached, will, at its attached area, be rotatably fast with the peripheral region of the cable wheel, a handle for rotating the cable wheel, the handle being positioned outside the housing and adjacent a forward end face thereof, the handle being capable of operative securement with respect to the cable wheel in any of a plurality of angular orientations relative thereto about the axis thereof, a chamber within said housing in which the cable wheel is positioned, the chamber opening to the rearward face of the housing which is adapted for mounting the operator mechanism, the chamber opening being closed upon such mounting, the cable wheel incorporates a hub which is journalled for rotation in the housing, the hub projects through and forwardly of the forward end face of the housing, the projecting and face of the hub being serrated, and the handle has a hub with complementary serrations by which the handle can be positively mounted on the cable wheel hub in any of said multitude of angular orientations relative to the cable wheel, screw means for securing the handle at its hub to the cable wheel hub, means for limiting the degree of rotational movement available to the cable wheel.

4,007,646

MODEL VEHICLE CONTROL SYSTEM

Edward N. De Jonge, 5024 Ovid Place, San Diego, Calif. 92117

Filed May 1, 1975, Ser. No. 573,763
Int. Cl.² A63H *27/04*
U.S. Cl. 74—501 R **6 Claims**



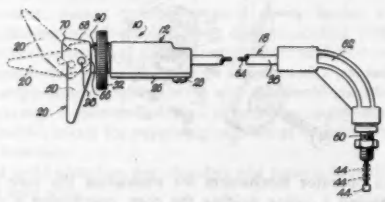
1. A model vehicle control system, comprising:
an elongated flexible rod having a butt end and a tip end, said rod being substantially rigid at the butt end and increasing in flexibility toward the tip end;
a control unit secured on said butt end and having hand operated control means mounted therein;
a connector on said tip end with means for universal pivotal attachment to a vehicle to be controlled;
flexible cables coupled to said control means and extending along said rod to said connector;
guide means spaced along the rod for supporting said cables;
and terminal guidance means on said connector for guiding said cables into the vehicle.

4,007,647

CHOKE CONTROL ASSEMBLY

John A. Carlson, Wichita, Kans., assignor to Conchemco, Incorporated, Lenexa, Kans.

Filed Aug. 13, 1975, Ser. No. 604,321
Int. Cl.² F16C *1/10*
U.S. Cl. 74—501 R **10 Claims**



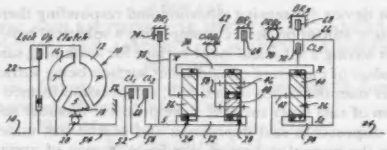
1. A control assembly including:
an elongate body having mounting means thereon for attachment to a mounting panel or the like;
an elongate slide member carried by said body for longitudinal non-rotatable reciprocation relative thereto,
said slide member having at least one end projecting beyond said body;
a lever secured to said one end of said slide member;
at least one control element secured to and extending from an opposite end of said slide member for the reciprocable shifting movement therewith; and
means for biasing said slide member in the direction of said control element and for maintaining said lever in abutment with said body,
said lever being selectively shiftable relative to said slide member and said body from a normal position to at least one alternate position in which said slide member is shifted against the action of said bias means in the direction of said lever to correspondingly reposition said control element.

4,007,648

FIVE-SPEED AUTOMATIC TRANSMISSION

Charles C. Bookout, Orchard Lake, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Apr. 24, 1975, Ser. No. 571,025
Int. Cl.² F16H *57/10*
U.S. Cl. 74—763 **6 Claims**



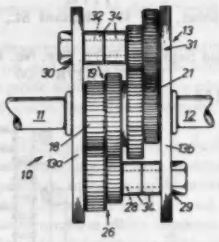
1. A multiple ratio power transmission mechanism for use in an automotive vehicle driveline for delivering torque from a driving shaft to a driven shaft comprising three planetary gear units, said gear units including first and and second planetary units and a compound planetary gear unit, each planetary gear unit having a ring gear, a sun gear, planetary pinions engaging the sun and the ring gears and a carrier for journalling the planetary pinions, the sun gears for the first simple planetary gear unit and the compound planetary gear unit being connected together, the ring gears for the planetary gear units being connected together, the carrier of the second planetary gear unit being connected to said driven shaft, the driving shaft being connected to the carrier of said compound planetary gear unit, first clutch means for establishing a torque delivery path to said torque input shaft during operation in each forward driving ratio, second clutch means for establishing a torque delivery path to the common sun gear for the first planetary gear unit and said compound gear unit during operation in the fourth and fifth forward driving ratios and during operation in reverse ratio, first brake means for anchoring the carrier of the first planetary gear unit during operation in the first two underdrive ratios, second brake means for anchoring the sun gear of the second simple planetary gear unit during operation in the first speed ratio and in the third and fourth speed ratios, and third brake means for anchoring the sun gears of said first simple planetary gear unit and said compound planetary gear unit during operation in the third drive ratio.

4,007,649

TRANSMISSION ASSEMBLY

Harry Stirland, 'Poplars', Fosse Road, Colston, Nottinghamshire, England

Filed May 1, 1975, Ser. No. 573,801
Claims priority, application United Kingdom, May 2, 1974, 19400/74
Int. Cl.² F16H 1/28
U.S. Cl. 74—803 16 Claims



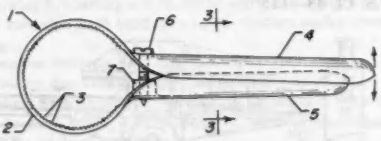
1. A transmission assembly comprising an input shaft and a take-off shaft in co-axial alignment, a gear carrying member rotatably mounted on the input and take-off shafts, a first gear fixedly mounted on the input shaft and a second gear fixedly mounted on the take-off shaft, a control gear co-axial with the input and take-off shafts and mounted for rotation relative thereto, a first gear train rotatably carried by the gear carrying member and arranged to provide a driving connection between the first gear and the control gear and a second gear train rotatably carried by the gear carrying member and arranged to provide a driving connection between the control gear and the second gear, the first and second gear trains being arranged to rotate the gear carrying member in opposite directions for a given direction of rotation of the input shaft, the first gear, first gear train and control gear being so sized to form a step down in rotational speed from the first gear to the control gear, and the control gear, second gear train and second gear being so sized to form a step up in rotational speed from the control gear to the second gear, the gear sizes being such that the amount of step up is greater than the amount of step down, the arrangement being such that for a given speed of rotation of the input shaft the assembly automatically adjusts the speed of rotation of the take-off shaft between a maximum and a minimum speed of revolution in accordance with load applied to the take-off shaft.

4,007,650

GARDEN HOSE COUPLING TOOL

Lester R. Wellman, Highland Park, Ill., assignor to Barbara F. Wellman, Highland Park, Ill.

Filed Nov. 12, 1975, Ser. No. 631,411
Int. Cl.² B25B 13/52
U.S. Cl. 81—64 2 Claims



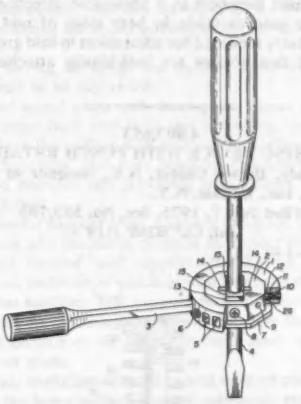
1. A hose coupling handle which comprises, in combination:
a. a unitary body having a pair of elongated arms, one end of each being integral with a wider flat portion forming a band-like ring, the interior surface of which is knurled parallel to the central axis of said ring, said arms being (i) U-shaped in cross section, (ii) of unequal length and, (iii) sized to provide nesting of the shorter arm within the longer arm; and,
b. means providing a wrapping force of said ring around said coupling, said means disposed (i) proximate to the junction of said arms with said wider flat portion and, (ii) substantially perpendicular to the horizontal plane containing the axis of said ring.

4,007,651

DEVICE FOR INCREASING THE TORQUE APPLIED TO A HAND TOOL

Douglas J. Scott, 62 Lawrence Ave., Smithtown, N.Y. 11787

Filed Oct. 1, 1975, Ser. No. 618,635
Int. Cl.² B25B 13/48
U.S. Cl. 81—180 R 8 Claims

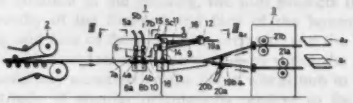


1. Apparatus to increase the torque applied to the shaft of a hand tool comprising:
a. a lever arm,
b. a generally disc shaped shaft holder with a first hole located at the center of the disc, the axis of said hole being colocated with the axis of revolution of the disc shaped shaft holder, and a plurality of holes located about the periphery of the holder with their axes oriented generally perpendicular to the axis of revolution of said disc shaped shaft holder, each hole of said set of holes adapted to accept one end of said lever arm, said holder being divided into an outer and inner section which are separable, said inner section including said first hole in the center of the holder and the outer section including said plurality of holes about the outer periphery of the holder,
c. a first securing means to connect the tool shaft to the holder, said means being located about the periphery of said first hole, and
d. a second securing means to connect said inner and outer sections, whereby a single outer section and a lever may be used in conjunction with a variety of different tools, each of which has a separate inner section adapted to accept a particular tool.

4,007,652
CONTINUOUSLY VARIABLE CUTTING APPARATUS FOR ELONGATED SHEET MEMBERS

Tsutomu Shinomiya, Iwatsuki, and Sanji Itoh, Tokyo, both of Japan, assignors to Kabushiki Kaisha Tomoku, Otaru, Japan

Filed Jan. 5, 1976, Ser. No. 646,869
Claims priority, application Japan, Jan. 9, 1975, 50-4654
Int. Cl.² B26F 3/00
U.S. Cl. 83—106 5 Claims

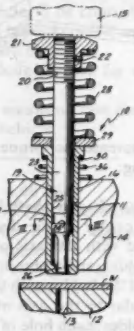


1. A continuously variable cutting apparatus for elongated sheet members that are continuously supplied in a longitudinal moving direction thereof and at desired intervals of width; comprising several first projection nozzles connected to a high-pressure liquid source, said first nozzles being disposed to form at least two rows that extend transversely relative to the moving direction; at least one second injection nozzle connected to a high-pressure liquid source, arranged to be driven transversely relative to the moving direction, said second nozzle being provided at a downstream position of the sheet members, below said first nozzles; a holding rod provided above the sheet members in a transverse direction thereof, having guide grooves made in both sides of said rod; and members slidably mounted for adjustment in said grooves; and wherein said first nozzles are individually attached to said members.

4,007,653
PUNCHING DEVICE WITH PUNCH RETAINER

Percy L. Cady, Darien Center, N.Y., assignor to Houdaille Industries, Inc., Buffalo, N.Y.

Filed July 7, 1975, Ser. No. 593,783
Int. Cl.² B26F 1/14
U.S. Cl. 83—140 5 Claims

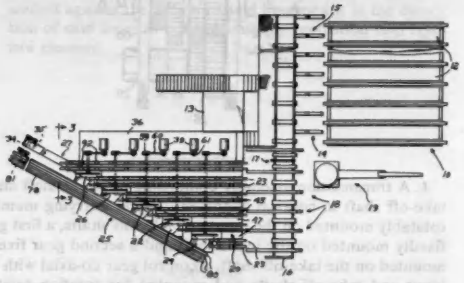


1. A punching device comprising:
a. a frame having a lower arm on which a die is supported, and an upper arm having a vertical bore aligned therewith;
b. a punch guide and stripper sleeve slidably disposed in the bore in said upper arm;
c. a punch having a body slidably diposed in said sleeve, said body having a radially opening recess therein directed toward the interior of said sleeve;
d. a stripping spring acting between said sleeve and said punch to urge the lower end of said punch into said sleeve;
e. a friction member, carried by said body, disposed in said body recess and having a sliding frictional fit with the interior wall of said sleeve greater than that which the punch body inherently has; and
f. a lifting spring acting between said sleeve and said upper arm and urging said sleeve away from said die.

4,007,654
SAWING APPARATUS OF THE PULPWOOD SLASHER TYPE

Sumner R. Oleson, 117 W. Pleasant St., Westbrook, Maine 04092

Filed Sept. 25, 1975, Ser. No. 616,674
Int. Cl.² B27B 7/00
U.S. Cl. 83—155 13 Claims

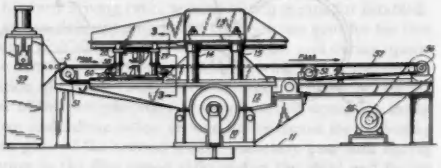


1. A slasher for cutting logs into lengths suitable for use as pulpwood, said slasher including a log-supporting deck and structure supporting said deck in a upwardly inclined position, said deck substantially in the form of a right triangle, a series of parallel circular saws spaced along the upwardly inclined side of the deck that corresponds to the hypotenuse of said triangle, conveying means extending from the lower to the upper end of the deck parallel to the other upwardly inclined side thereof and operable to support a log. transversely of the deck and carry that log into engagement with the saws, said saws being so positioned that the distance between each two saws provides the desired length into which the conveyed log is to be cut, that a log is in contact with only one saw at a time, and that each length being cut protrudes from said first named side, and said conveying means includes courses holding each log on both sides of each saw as said log is being cut thereby, the course supporting the protruding end thereof terminating in such relation to the proximate saw as to permit each cut length to drop from the deck immediately upon being cut free.

4,007,655
FLYING CUTTER WITH CONTINUOUS WORK PIECE SUPPORT

James W. Schuetz, Pittsburgh, and William A. Martin, Volant, both of Pa., assignors to Aetna-Standard Engineering Company, Ellwood City, Pa.

Filed July 31, 1975, Ser. No. 600,265
Int. Cl.² B23D 25/04
U.S. Cl. 83—155 4 Claims



1. A flying cutter apparatus for cutting a web into lengths, characterized by
a. a cutter carriage;

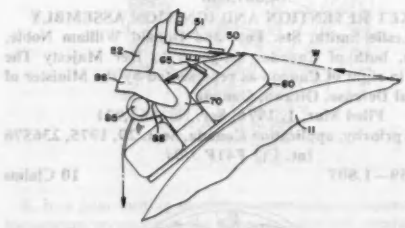
b. a carriage supporting structure including telescopically connected upper and lower platen structures;
c. said cutter carriage carried by said supporting structure and movable thereon along a strip pass line through said apparatus between first and second limit positions;
d. opposed upper and lower shear blades on said cutter carriage;
e. said upper and lower platen structures supporting and confining said cutter carriage and operative upon telescopic closing movement to compress said carriage and actuate said opposed shear blades through a cutting motion;
f. a plurality of transversely spaced, longitudinally extending slide elements on said platen structures and said carriage;
g. strip conveyor guide means including a plurality of transversely spaced guide belts for conveying strip through said apparatus;
h. said strip conveyor guide means including entry-side guide means for supporting the strip upstream of said first carriage limit position, exit-side guide means for supporting the strip downstream of said second carriage limit position, and intermediate strip supporting means between said entry-side and exit-side guide means;
i. said intermediate strip supporting means mounted on said carriage for guiding said spaced belts along said pass line to and from points adjacent said shear blades, and in the region between said points guiding said belts below said carriage; and
j. said conveyor guide means including means between said lower platen structure and said carriage for guiding said spaced belts between said transversely spaced slide elements.

4,007,656

APPARATUS FOR CUTTING A WEB OF SHEET MATERIAL

Robert G. Erdody, Wilmington, Del.; Paul E. Harmon, and Richard S. Tetro, both of Fulton, N.Y., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del. and The Black Clawson Company, Middletown, Ohio, part interest to each

Division of Ser. No. 481,203, June 20, 1974. This application Dec. 11, 1975, Ser. No. 639,988
Int. Cl.² B26D *7/14*
U.S. Cl. 83—175 **8 Claims**



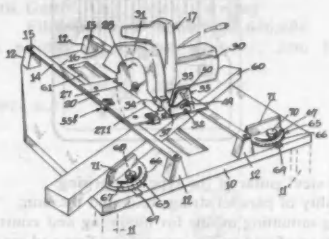
1. Apparatus for cutting a web, particularly a moving web of a material having a high tendency to elongation under stress, comprising:
a. base means defining a cutting station and including means for guiding the web through said cutting station,
b. a cutting knife mounted for cutting movement with respect to said guide means along a predetermined path through said cutting station,
c. seizing means for the web mounted for movement with respect to said guide means to a holding station spaced relatively closely downstream from said cutting station to isolate the portion of the web located between said stations from tension forces downstream thereof,
d. drive means for causing said knife and said seizing means to execute said movements thereof in timed relation, and
e. said cutting movement of said knife including a component directed along and upstream of said web path to develop tension in said isolated portion of the web.

4,007,657

SAW TABLES

Andrew E. Burch, 199 Ohio St. NW., Warren, Ohio 44485

Filed Dec. 5, 1975, Ser. No. 638,190
Int. Cl.² B27B *5/20*
U.S. Cl. 83—471.3 **10 Claims**



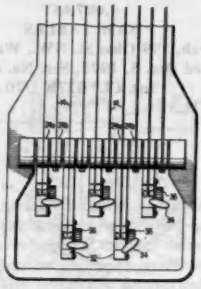
1. A saw table for use with a portable power saw of conventional construction, said saw having a motor housing, and a shroud enclosing the upper portion of the rotatable saw, comprising:
a base having an upper flat surface upon which work is adapted to be supported,
a pair of metal guide rails having flat upper surfaces and supported from said base and extending upwardly from said base flat surface with said rail flat surfaces in parallelism therewith, said rails being spaced apart a predetermined distance and providing facing edges which are in parallelism,
a rigid metal support plate, carrying (adapted to carry) said housing and shroud in position to project from an upper surface thereof, said support plate having a lower flat surface, portions of which overlie and engage against said rail flat surfaces, said support plate also having a slotted opening (a slot adapted) to pass the saw blade so that a lower portion of the latter (thereof) projects below said support plate,
four guide members secured to said support plate to project from the lower surface thereof, said guide members being spaced from each other and arranged in a square pattern, opposite sides of said square pattern being selectively alignable with the facing edges of said guide rails, said support plate slot being disposed between and parallel to two opposite sides of said square pattern,
the distance between any adjoining pair of guide members being substantially equal to the spacing between the edge surfaces of said guide rails, and pairs of said guide members at one and (or) the other of opposite sides of said square pattern being selectively engageable with respective edge surfaces of said guide rails to selectively position said support plate and the power saw carried thereby in any one of two positions, which positions are at right angle to each other, whereby said saw may be engaged with said work for crosscutting and ripping operations,
said support plate and the saw carried thereby being moved from one position to the other by lifting said support plate from said rails to clear the pair of guide members engaged with the edge surfaces of said guide rails and turning said support plate ninety degrees in planar fashion, and then lowering said support plate onto said rails with the other pair of guide members engaged with the side edges of said rails.

4,007,658

STRING MOUNTING AND ADJUSTMENT FOR STEEL GUITARS

Harold T. Spain, 1900 Ridgemont Road, Richmond, Va. 23224

Filed Aug. 29, 1975, Ser. No. 608,981
Int. Cl.² G10D 3/14
U.S. Cl. 84—312 **8 Claims**



1. In a steel guitar of the type comprising:
a plurality of parallel strings mounted thereon;
a string-mounting means for mounting and controlling the tensions of said strings comprising first and second string supporting and tensioning assemblies located at opposite ends of said steel guitar, each of said assemblies including elongated displaceable levers between which said strings extend, each lever including an arcuate portion over which an attached string passes, and a string securing means for attaching the end of said string to said lever; and
a lever actuating means for adjustably displacing said levers to selectively vary the tensions of the strings attached to said levers;
the improvement wherein only one of said string securing means for each of said strings includes a rotatable tuning peg about which said string wraps, said tuning peg including a hand gripping portion which can be hand grasped and hand rotated for manual tuning, the rotatable tuning pegs being positioned at opposite ends of said steel guitar for adjacent strings.

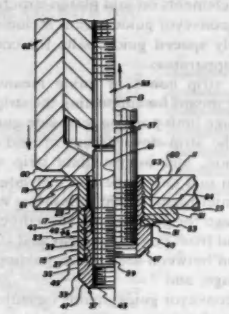
4,007,659

FASTENER INSERT WITH IMPROVED ANTI-ROTATION AND PULL-OUT CHARACTERISTICS

Edgar L. Stencel, Huntington Beach, Calif., assignor to VSI Corporation, Pasadena, Calif.

Continuation-in-part of Ser. No. 396,263, Sept. 11, 1973, which is a continuation of Ser. No. 238,420, March 27, 1972, abandoned, and a continuation-in-part of Ser. No. 448,009, March 4, 1974, abandoned, which is a continuation-in-part of Ser. Nos. 342,875, March 19, 1973, abandoned, and Ser. No. 238,420, March 27, 1972, abandoned. This application Feb. 13, 1975, Ser. No. 549,562
Int. Cl.² F16B 13/10
U.S. Cl. 85—70 **17 Claims**

1. A blind fastener system for connecting a threaded member to a relatively thin, plate-like workpiece having a hole and an accessible surface comprising:
a. an outer relatively ductile deformable cylindrical sleeve having;
i. an expansion portion of small inner diameter in the workpiece, and
ii. a bulbing portion of a larger inner diameter on the blind side of the workpiece, and
b. a slidable relatively non-deformable threaded expander member comprising:
i. an expander portion for expanding the expansion portion of the sleeve on axial movement of the expander member, said expander portion being of a larger diameter than the inner diameter of the sleeve expansion portion, and having an exterior configured portion at least part of which is movable into said sleeve expansion portion,
ii. an enlarged head portion for engaging the blind side end of the sleeve for bulbously deforming said sleeve bulbing portion on axial movement of the expander member,
iii. an axial bore extending into said expander member from the end opposite said enlarged head portion, said



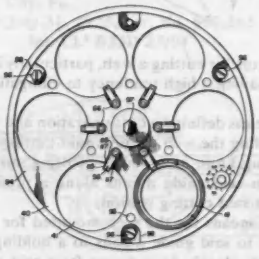
bore being internally threaded over at least an axial portion thereof lying inwardly of said configured portion,
iv. the minor diameter of the configured portion in at least about 1.23 times the major thread diameter.
c. said system being characterized by the expander member expander portion having:
i. an entry portion having a tapered loading end, and
ii. a configured portion rearwardly thereof and having a substantial portion thereof within the workpiece after axial movement,
d. said sleeve having a tapered shoulder between said inner diameters.

4,007,660

ROCKET RETENTION AND IGNITION ASSEMBLY

Donald Leslie Smith, Ste. Foy, and Donald William Noble, Ottawa, both of Canada, assignors to Her Majesty The Queen in right of Canada as represented by the Minister of National Defense, Ottawa, Canada

Filed Mar. 1, 1976, Ser. No. 662,921
Claims priority, application Canada, Sept. 29, 1975, 236576
Int. Cl.² F41F 3/04
U.S. Cl. 89—1.807 **10 Claims**



1. A rocket retention and ignition assembly for a rocket launcher and for a rocket with a retention member outwardly extending from the side of the rear end of said rocket, said

retention member disconnecting from the remainder of said rocket when said rocket is fired, and a first electrical contact on said rear end, said assembly comprising first support means for engaging said retention member when said rocket is placed in a firing position in said rocket launcher and preventing forward displacement of said retention member from the firing position, said first support means having a loading hole formed therein to permit loading of said rocket therethrough into said rocket launcher, said hole being too small to permit passage of said retention member therethrough, second support means for engaging said retention member when said rocket is in said firing position and preventing rearward displacement of said retention member from the firing position, said second support means having an opening formed therein, said opening being located at said rear end when said second support means engages said retention member, a second electrical contact attached to said second support means, and electrical connection means having two parts, one of said two parts being attached to said second support means and electrically connected to said second contact, the other of said two parts being attached to said first support means, wherein by simply placing said rocket in said firing position and orienting said second support means with respect to said first support means in such manner that said two parts are electrically connected to each other when said second support means engages said retention member, said second contact contacts said first contact and an electrical circuit is thereby formed for firing said rocket.

4,007,661
GEAR CUTTING MACHINE

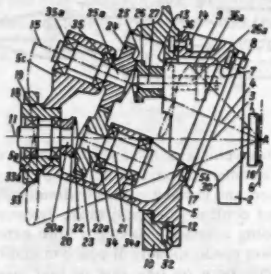
Otto Hildinger, Schwerzenbach, Switzerland, assignor to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG, Zurich, Switzerland

Filed June 2, 1975, Ser. No. 582,749

Claims priority, application Switzerland, June 7, 1974, 7793/74

Int. Cl.² B23F 9/10

U.S. Cl. 90—5 **6 Claims**



1. In a gear cutting machine comprising a support body, a tool means mounted in the support body and rotatable about a first axis, a head in which there is mounted the support body for angular adjustment about a second axis such that the first axis is movable along a first imaginary cone-shaped shell about the second axis, a headstock in which there is mounted the head for angular adjustment about a third axis in such a manner that the second axis is movable on a second imaginary cone-shaped shell about the third axis, a gear train for driving said tool means, said gear train including two pairs of bevel gears, the cone apex- cone angles of the bevel gears of one pair being equal to the cone apex- cone angles of the bevel gears of the other pair, said cone angles being obtuse, and a pair of spur gears drivingly interconnecting both of the pairs of bevel gears, and said second axis coinciding with the axis of one of said bevel gears in one pair of said bevel gears and said third axis coinciding with the axis of one of said bevel gears in the other pair of said bevel gears, whereby the gear train operatively interconnects the first axis via the second axis with the third axis.

4,007,662
AXIAL PISTON MACHINE OF OBLIQUE-AXLE CONSTRUCTION WITH TILTABLE CYLINDER DRUM

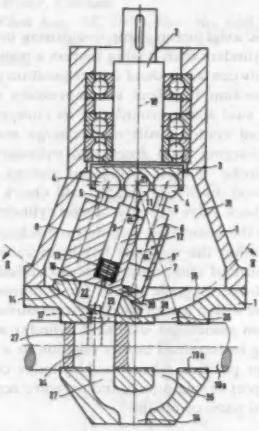
Horst Deininger, Ulm, Donau, Germany, assignor to Hydromatik GmbH, Ulm, Donau, Germany

Filed Jan. 2, 1976, Ser. No. 646,404

Claims priority, application Germany, Jan. 17, 1975, 2501867

Int. Cl.² F01B 13/04

U.S. Cl. 91—6.5 **6 Claims**



1. An axial piston machine of the kind having an oblique-axle construction with tiltable cylinder drum and drive-connected drive pulley stationarily supported in a casing, pistons movable in cylinder bores of the drum being articulated to the drive pulley via ball-and-socket joints and with a control mirror member with control ports which face the outlets of the cylinder bores, a cylindrical back side of the mirror member facing away from the control mirror being supported on a suitably shaped guide surface of the casing, and the control mirror member being tiltable by an adjusting device which tilts the cylinder drum in order to adjust the stroke of the engine, and the bearing surface being provided with orifices connected with suction and pressure ducts for the pressure medium, which orifices are connected with the control ports via conduits penetrating through the control mirror member, characterized in that the control mirror body with the cylinder drum is adjustable in both directions from a middle position with zero speed stroke of the pistons and that the orifice in the guide surface which at a given time is connected with the suction duct and the pressure duct is divided into a pair of orifices connected via connecting ducts with a respective one of the suction and pressure ducts, the pair of orifices being symmetrical in the direction of tilt of the mirror member with its middle position in the guide surface, and that the orifice of each pair which at a given time is located against a momentary tilting direction and not covered by the mirror member is disconnected by a closing device from the associated suction or pressure duct.

4,007,663

HYDRAULIC PUMP OF THE AXIAL PISTON TYPE

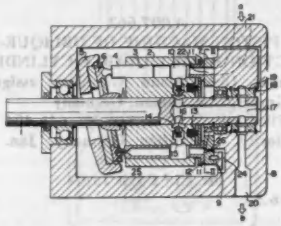
Kuniyasu Nagatomo, and Masato Hiromatsu, both of Chikushino, Japan, assignors to Mitsubishi Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 27, 1975, Ser. No. 544,388

Claims priority, application Japan, Feb. 1, 1974, 49-13962; Feb. 1, 1974, 49-14056[U]

Int. Cl.² F01B *3/00*; **F04B** *1/12*

U.S. Cl. 91—6.5 **13 Claims**



1. A hydraulic axial piston pump comprising means defining a plurality of cylinders each having therein a piston reciprocably movable between a top dead center position and a bottom dead center position to effect a compression stroke and a suction stroke, said piston completing its compression stroke at said top dead center position, discharge means for said pump for discharging fluid from said cylinders during the compression stroke of their associated pistons, check valve means within said discharge means, said check valve means comprising a check valve for each of said cylinders adapted to open and allow the associated cylinder to discharge fluid when the pressure within the cylinder has been raised above the discharge pressure of said pump by an associated piston on its compression stroke, passage means for communicating each of said cylinders with a low pressure system during a period in which the piston associated with said cylinder moves from a point preceding its top dead center position to a point past its top dead center position where said cylinder communicates with a suction port of said pump, and pressure reducing means disposed in said passage means.

4,007,664

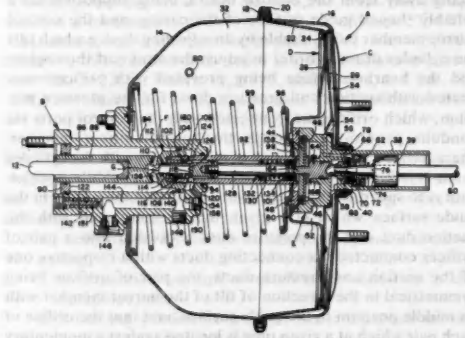
HYDRAULIC BOOSTER

Roger C. Popp, Chesaning, Mich., assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Sept. 26, 1975, Ser. No. 617,198

Int. Cl.² F15B *9/10*, *13/06*

U.S. Cl. 91—49 **10 Claims**



1. A hydraulic booster comprising; a cylinder having a piston received therein for movement from a passive position adjacent one end of said cylinder to force output positions toward the other end of said cylinder, normally open valve means for establishing communication through said piston from one side to the other thereof, hydraulic fluid return port means communicating with said cylinder adjacent said other end of said cylinder, hydraulic fluid supply port means communicating with said cylinder adjacent said one end thereof, said piston in said passive position thereof being located with respect to said supply port means for flow of hydraulic fluid through said supply port means directly into said cylinder on both sides of said piston so that fluid flows through said supply port means into said cylinder on both sides of said piston not only by flowing through said valve means from one side to the other of said piston but by flowing directly from said supply port means into said cylinder on both sides of said piston and would so flow in said passive position of said piston even if said valve means were closed, and operating means for closing said valve means and moving said piston past said supply port means to a position wherein hydraulic fluid flows through said supply port means into said cylinder only between said piston and said one end of said cylinder.

4,007,665

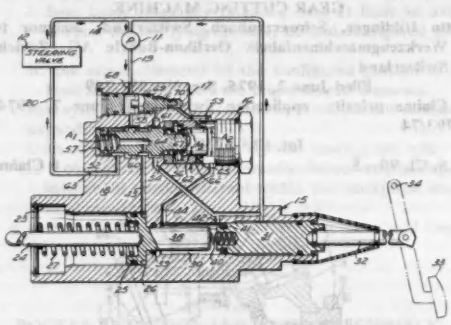
BRAKE BOOSTER WITH IMPROVED PEDAL FEEL CHARACTERISTICS

Edward S. Orzel, Parma, Ohio, assignor to The Weatherhead Company, Cleveland, Ohio

Filed Nov. 28, 1975, Ser. No. 635,858

Int. Cl.² F15B *13/10*, *17/02*

U.S. Cl. 91—391 R **16 Claims**



1. In a motor vehicle, a fluid power circuit comprising a pump having an inlet side and an outlet side, a control valve, a brake booster, and conduit means hydraulically connecting said pump and control valve and brake booster; said brake booster including a housing having a bore extending therethrough, a power piston slidably disposed in said bore, a power chamber in said bore on one side of said power piston, a trapped volume chamber in said housing, an output rod on said one side of said power piston extending into said trapped volume chamber and having a predetermined lateral cross-sectional area exposed to a fluid pressure level in said trapped volume chamber, an input rod slidably disposed for movement to and from a deactuated position in said housing and extending into said trapped volume chamber, said input rod having a predetermined lateral cross-sectional area exposed to the fluid pressure level in said trapped volume chamber, said input rod area being substantially greater than said output rod area and being constructed and arranged such that movement of said input rod in said trapped volume chamber results in proportional but larger movement of said output rod when the volume of fluid in said trapped volume chamber remains substantially constant, a brake pedal operatively connected to said input rod for moving said input rod in said trapped volume chamber; said control valve including a control spool bore and a control spool slidably disposed in said control spool bore, brake booster valve means on said control spool movable

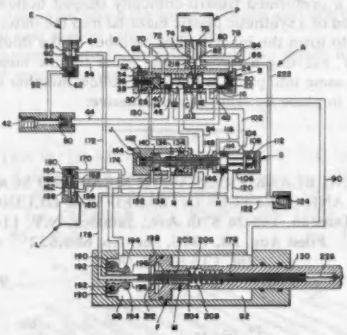
toward and away from a fully open position controlling fluid pressure communication between said pump outlet side and said brake booster power chamber, said control spool having first and second opposite lateral end faces, passage means maintaining open fluid pressure communication between said first end face and the fluid pressure of said power chamber under all normal operating conditions, further passage means maintaining open fluid pressure communication between said second end face and the fluid pressure of said trapped volume chamber under all normal operating conditions, said brake booster valve means being constructed and arranged so that said power chamber fluid pressure acting against said first end face urges said brake booster valve means away from said fully open position and so that said trapped volume fluid pressure acting against said second end face urges said brake booster valve means toward said fully open position, control spool modifying means slidably disposed in said control spool bore, said control spool modifying means having a modifying area, said further passage means maintaining open fluid pressure communication between said modifying area and the fluid pressure of said trapped volume chamber under all normal operating conditions, said control spool modifying means having connector means operatively connecting said modifying area to said control spool, said connector means being constructed and arranged to transmit the force of said trapped volume chamber pressure acting against said modifying area to said control spool when the force exerted on said brake pedal is less than a predetermined force to urge said brake booster valve means toward said fully open position, and said control spool modifying means including stop means exterior of said control spool rendering said modifying area inoperable to further increase the force transmitted through said connector means to said valve spool when said force exerted on said brake pedal is greater than said predetermined force.

4,007,666

SERVOACTUATOR

Dan O. Bauer, and Robert M. Salemka, both of Kalamazoo, Mich., assignors to Pneumo Corporation, Boston, Mass.

Filed May 23, 1974, Ser. No. 472,627
Int. Cl.² F15B *13/042*; F16K *31/122*
U.S. Cl. 91—446 **10 Claims**



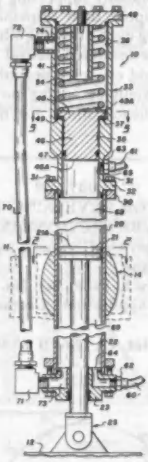
1. In a servoactuator device for controlling the position of a ram having a forward end cavity and a rear end cavity, the improvement comprising servovalve means for selectively connecting a source of high pressure hydraulic fluid to either of said cavities for selectively extending or retracting said ram, vent means for venting one of said cavities to return port means through said servovalve means when the other of said cavities is connected with said source of high pressure hydraulic fluid, ventline pressure responsive rate limiter valve means in series with said return port means for limiting the rate at which fluid is vented from said one cavity during normal operation, differential pressure responsive blocking actuator means for moving said rate limiter valve means to a blocking position for blocking flow of fluid from said one cavity to said return port means, said differential pressure responsive blocking actuator means being in operatively direct communication with said one cavity and acted upon by the pressure therein in a direction for moving said rate limiter valve means to said blocking position, and selectively operable blocking valve means for connecting said one cavity with said differential pressure responsive blocking actuator means to hold same in place and for connecting said differential pressure responsive blocking actuator means with said vent means thereby permitting said directly communicated fluid pressure from said one cavity acting on said differential pressure responsive blocking actuator means to actuate same and to move said rate limiter valve means to said blocking position.

4,007,667

HYDRAULIC POSITIONING AND SHOCK-ABSORBING APPARATUS

Jacob K. Elias, and Victor G. Eriksen, both of Campbell River, Canada, assignors to Fauchon Engineering Works Limited, Campbell River, Canada

Filed Aug. 15, 1975, Ser. No. 605,169
Int. Cl.² F01B *31/14*
U.S. Cl. 92—60 **3 Claims**

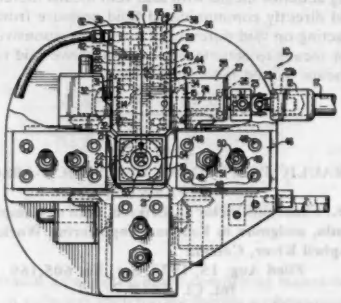


1. Apparatus for positioning a machine part subject to shock loads comprising a main cylinder having a piston and a piston rod therefor, said piston dividing the main cylinder into a head chamber and a rod chamber, fluid circuit means separately connecting the head and rod chambers to a source of fluid pressure whereby the piston rod can be extended or retracted as required to locate and hold the machine part in a selected position, an auxiliary cylinder having a through bore open to the head chamber and a shoulder between said through bore and a chamber within said auxiliary cylinder, a piston in the through bore and having an end flange in the auxiliary cylinder, a compression spring within the auxiliary cylinder chamber biasing the piston thereof towards the main cylinder and normally abutting the end flange against the shoulder, and a conduit connecting the rod chamber to the auxiliary cylinder chamber.

4,007,668
CRIMPER ASSEMBLY

Herbert K. Holden, Bon Air, and Peter W. Mansfield, Richmond, both of Va., assignors to American Filtrona Corporation, Richmond, Va.

Filed Mar. 28, 1975, Ser. No. 562,911
Int. Cl.² B31F 1/10
U.S. Cl. 93—1 C 11 Claims

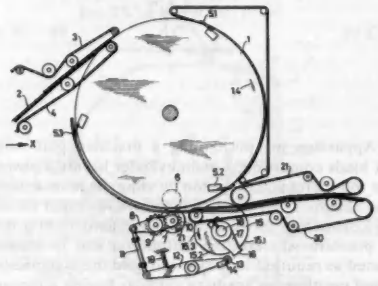


1. In a crimping assembly for crimping a rod of fibrous material, said assembly having at least one pair of crimping wheels each having embossing means defined on its peripheral surface, means for rotatably supporting each pair of crimping wheels so as to juxtapose their respective embossing means and means for rotating each crimping wheel, the improvement comprising a separate insulated central heater block extending axially through said crimping assembly, said heater block having at least one axially extending cartridge heater conduit located within said heater block for heating said crimping wheels.

4,007,669
APPARATUS FOR REVERSING THE RUNNING DIRECTION OF TUBE SECTIONS IN SACK MACHINES

Fritz Achelpohl, Lengerich, Germany, assignor to Windmoller & Holscher, Germany

Filed July 2, 1975, Ser. No. 592,668
Claims priority, application Germany, July 4, 1974, 7422818
Int. Cl.² B65H 5/00
U.S. Cl. 93—8 R 11 Claims

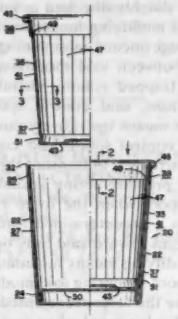


1. Apparatus for reversing the running direction of a tube section in a machine for making sacks or bags which are closed by a base at both ends particularly sacks or bags of plastics film, comprising a turning cylinder provided with grippers for engaging the tube sections and a pair of rollers for conveying the tube sections in a direction opposite to said running direction, at least one roller of said pair being movable, and a control for suddenly moving said pair of rollers together to grip the tube sections and to separate the pair of rollers again after transferring the tube sections to an associated feed conveyor.

4,007,670
INSULATED CONTAINER

John V. Albano, Oradell, and Donald F. Smith, Clifton, both of N.J., assignors to St. Regis Paper Company, New York, N.Y.

Division of Ser. No. 446,703, Feb. 28, 1974, abandoned. This application Feb. 14, 1975, Ser. No. 549,979
Int. Cl.² B31B 7/74
U.S. Cl. 93—36.01 7 Claims

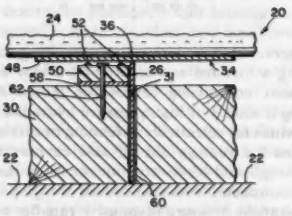


1. The method of making a double wall container including the steps of applying a first paper blank to the sides of a frustro-conically shaped form and a second paper blank to the smaller diameter end of the form and connecting the two blanks together to form the outer hollow member of the double wall container, applying a first adhesive to selected edges of said first paper blank to hold the outer hollow member in its formed shape, applying a second adhesive to the inner surface of the outer hollow member at an upper peripheral portion thereof by means of a member carrying adhesive and moved into the outer hollow member in a generally axial direction, inserting a preformed frustro-conically shaped hollow member formed of a synthetic plastic material into the outer hollow member to form the inner hollow member of the double wall container, exerting a force on the inner hollow member to press the same into place in the outer hollow member whereat it is held in place by said second adhesive.

4,007,671
FOLDING BLANK PRESS WITH MEANS TO SCARIFY BLANK SURFACES INTENDED FOR GLUING

Gordon Duncan, 148-26 87th Ave., Jamaica, N.Y. 11435

Filed Aug. 28, 1975, Ser. No. 608,632
Int. Cl.² B26D 3/08
U.S. Cl. 93—58 ST 9 Claims



1. Scarifying means intended for use in a press, comprising a press bed and pressure applying means for processing at

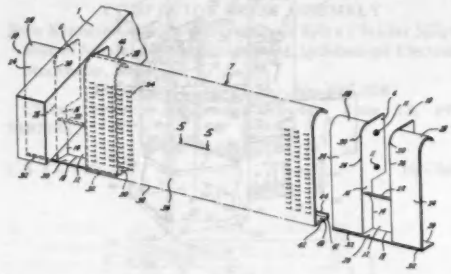
least one blank of paper, board or the like: comprising scarifying elements which when pressed together with said blank forms a scarified area on at least one portion of a surface of said blank for which an application of adhesive is intended; in which the scarifying means is mounted relative to the press bed with the scarifying elements between the press bed and the pressure applying means with provision for the blank to be held between the pressure applying means and the scarifying elements.

4,007,672

RAFTER VENT

William A. Luckey, P.O. Box 31275, El Paso, Tex. 79931

Filed June 23, 1975, Ser. No. 589,356
Int. Cl.² F24F *13/08*
U.S. Cl. 98—37 **9 Claims**



1. A rafter vent for occupying the space between a first and second adjacent building rafters, comprising:

a first rafter connector having first connecting means for connecting said first connector to such first adjacent building rafter;

a second rafter connector having second connecting means for connecting said second connector to such second adjacent building rafter;

said first and second rafter connectors each including a resilient tongue having a width at least as wide as such first and second adjacent building rafters;

filler means for filling the space between said first connector and said second connector; and

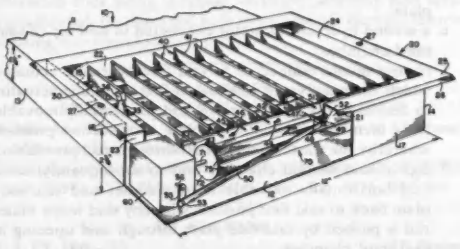
attachment means for attaching said filler means to said first and second connectors.

4,007,673

REGISTER WITH AIR-DRIVEN OSCILLATING LOUVERS

Peter P. Zaloga, 5818 W. Newport, Chicago, Ill. 60634

Filed Nov. 10, 1975, Ser. No. 630,143
Int. Cl.² E06B *7/02*; **F24F** *13/06*, *13/08*
U.S. Cl. 98—40 V **10 Claims**



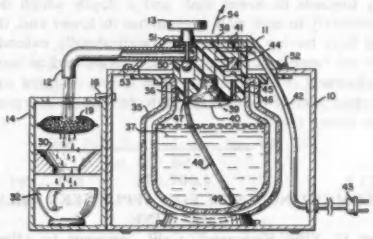
1. An air register for directing a stream of air from a wall duct of a forced air heating or ventilation system, said register comprising a frame defining an air outlet port through which the associated stream of air may flow, air deflecting means carried by said frame in said outlet port for movement in the associated stream of air, air-driven rotary windmill means mounted on said frame for rotation by the associated stream of air about an axis disposed substantially perpendicular to the direction of the stream of air, said windmill means comprises an elongated generally cylindrical reel-type turbine coaxial with said axis, said windmill means having a maximum outer diameter of rotation no greater than about one and one-half inches and being disposed behind said air deflecting means and substantially in registry therewith so that all of the air which passes over said windmill means also passes through said air deflecting means, and linkage means operably coupling said windmill means and said air deflecting means to effect movement of said air deflecting means upon rotation of said windmill means by the associated stream of air thereby to vary the direction of the stream of air as it passes through said outlet port.

4,007,674

BEVERAGE HEAT MAINTAINING APPARATUS

Abraham Lichowsky, Los Angeles, Calif., assignor to Ambitex Corporation and Cendev Corporation, both of Los Angeles, Calif.

Filed Nov. 24, 1975, Ser. No. 634,663
Int. Cl.² A47J *31/00*
U.S. Cl. 99—281 **6 Claims**



1. A beverage heat maintaining apparatus including in combination:

a. a container of evacuated double wall construction to provide heat insulation having an open neck for receiving a beverage after the beverage has been heated to a desired temperature;

b. a stopper member receivable in said neck, said stopper member incorporating an electric bulb having an exposed surface facing downwardly towards the top surface of said beverage when said container is filled, said electric light bulb being positioned by said stopper within said neck, and being of a size to cover a major portion of the cross-sectional area of said neck; and,

c. electrical conductors passing from said bulb through said stopper member and to the exterior thereof for connection to a source of electrical energy to energize said bulb, said bulb being evacuated whereby a major portion of said cross sectional area of the neck portion of said container is vacuum insulated by said bulb and whereby heat radiated by said bulb maintains said beverage in a heated condition.

4,007,675

COFFEE MILL

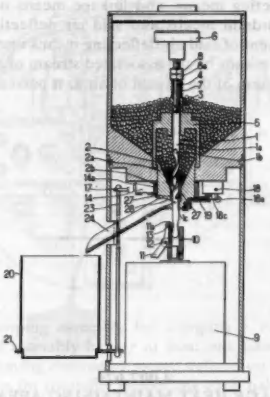
Serge Leon Louis Cailliot, 38, Rue de Bois de Boulogne, and Leopold Guy Pierre Andre, 26, Boulevard du Chateau, both of, 92200 Neuilly-sur-Seine, France

Filed Jan. 13, 1975, Ser. No. 540,539

Claims priority, application France, Jan. 14, 1974, 74.01180; Oct. 11, 1974, 74.34285

Int. Cl.[2] A47J *31/42*

U.S. Cl. 99—286 8 Claims



1. A coffee mill comprising a vertical screw of generally cylindrical form, provided with at least one helical groove and mounted to cooperate with a truncated conical crushing chamber having a substantially elliptical section decreasing in diameter towards a cylindrical bore at the lower end of the chamber, which bore serves to guide the lower part of the said screw, said groove having a pitch which decreases progressively towards its lower end, and a depth which decreases progressively to zero as it approaches its lower end, the cylindrical bore having at least two longitudinally extending diametrically opposed channels in the wall thereof, at least one of said channels communicating with a duct adapted to receive the upper part of a delivery chute for the delivery of milled coffee under gravity.

4,007,676

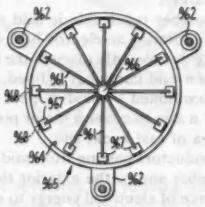
SEGMENTING KNIFE FOR APPLE SEED CELLING MACHINE

Robert G. Ellis, Richmond, Calif., assignor to Atlas Pacific Engineering Company, Emeryville, Calif.

Division of Ser. No. 431,691, Jan. 9, 1974, Pat. No. 3,962,963, and Ser. No. 247,838, April 26, 1972, Pat. No. 3,869,974. This application Apr. 22, 1975, Ser. No. 570,402

Int. Cl.[2] A23N *3/00*; A47J *25/00*; B26D *4/00*; B26B *3/00*

U.S. Cl. 99—545 4 Claims



1. A knife for cutting apples into segments, comprising: an outer circular ring; a hub provided centrally of the ring; a plurality of thin, flat, elongate knife blades each having opposite flat sides and opposite edges and each fixedly secured at one end to the hub and extending radially between the hub and the ring with the flat sides of each blade lying in planes parallel to the axis of the circular ring, the other end of each knife blade being fixedly secured in a mounting member; and means engaged between the ring and members exerting an axial tension force on the blades to maintain the blades straight upon travel of an apple through the knife.

4,007,677

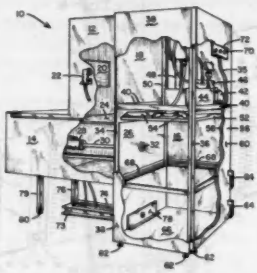
COMPACTOR DEVICE

Anthony Fox, 8306 Queen Ave. South, Minneapolis, Minn. 55431

Filed May 22, 1975, Ser. No. 579,783

Int. Cl.[2] B30B *15/18*

U.S. Cl. 100—45 1 Claim



1. A waste compacting apparatus comprising in combination:

a. an enclosure defining first and second chambers, said first chamber having an open top through which waste material to be compacted may pass, four side walls and a horizontally movable floor member;

b. said second chamber in communication with said first chamber and being disposed at least in part vertically beneath said first chamber, with said horizontally movable floor member defining a communicating port with said first chamber and closing said port when said horizontally movable floor member is in a first position, a horizontally retractable side plate connected to said horizontally movable floor member and a bottom and three additional side members connected together to define a rectangular compartment;

c. a third chamber having four sides, a top and a bottom, one of said sides having an opening which is closed by said horizontally retractable side plate when said horizontally movable floor member is in said first position, said top of said third chamber being vertically movable, one other side of said chamber including a latchable access door communicating therewith;

d. a first hydraulic actuator disposed in said second chamber and connected to said horizontally retractable side plate;

e. a second hydraulic actuator connected to said top of said third chamber;

f. control means connected to said first hydraulic actuator which when activated causes said first hydraulic actuator to become operative to move said horizontally movable floor member and said side plate to a second position whereby the waste material falls through said port in said top of said second chamber and to subsequently move said horizontally movable floor member and said side plate back to said first position whereby said waste material is pushed by said side plate through said opening in said third chamber;

g. further control means connected to said second hydraulic actuator which when activated causes said second hydraulic cylinder to become operative to move said top of said third chamber vertically downward to apply com-

pressive force to said waste material and to subsequently move said top of said third chamber vertically upward to its rest position;

h. a photo-electric sensor is disposed in said first chamber for activating said control means when the waste material in said first chamber reaches a predetermined level; and

i. a third hydraulic actuator having a piston oriented in a horizontal plane and passing through the side of said third chamber opposite to said other side including said access door, and manually actuatable control means associated with said third hydraulic cylinder for causing the compacted waste to be pushed horizontally outwardly from said third chamber by way of said access door, said manually actuatable control means including interlock means for preventing actuation of said third hydraulic actuator when said access door is in its latched position.

4,007,678
COMPACTOR PRESS ASSEMBLY

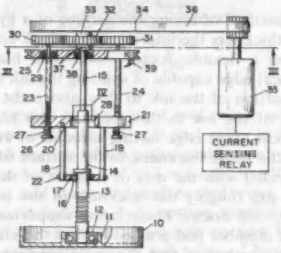
John Kenneth Crister Gustavsson, and Björn Christer Sjögren, both of Savsjo, Sweden, assignors to Aktiebolaget Electrolux, Stockholm, Sweden

Filed June 11, 1975, Ser. No. 585,850

Claims priority, application Sweden, June 13, 1974, 7407788

Int. Cl.² B30B *15/14*

U.S. Cl. 100—52 **10 Claims**



1. A compactor press assembly provided with a support structure having a lower bed plate comprising a piston adapted to be moved up and down relative to said support structure, a screw rotatably mounted in said piston, a pair of telescoping drive shafts, a drive means connected to one end of one of said drive shafts and said screw being connected to another end of said drive shafts, an upper support plate rigidly connected to said support structure of the assembly, a vertically movable part having a plurality of threaded holes, a spacer element connected to said vertically movable part and provided with a threaded hole, a pair of threaded rods each in engagement with a respective threaded hole in said vertically movable part, one end of each of said rods being journalled in said upper support plate, said part upon rotation of said threaded rods being movable vertically whereby said screw runs through the threaded hole in said spacer element thereby causing movement of said piston.

4,007,679
PRESS AND SAFETY LATCH THEREFOR

Bobbie Lee Edwards, Cincinnati, Ohio, assignor to Cincinnati Milacron, Inc., Cincinnati, Ohio

Continuation-in-part of Ser. No. 615,351, Sept. 22, 1975, Pat. No. 3,981,671. This application Mar. 22, 1976, Ser. No. 669,209

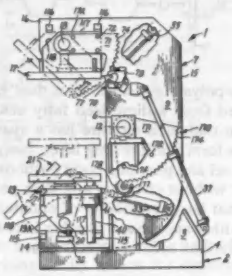
Int. Cl.² B30B *1/32*

U.S. Cl. 100—53 **17 Claims**

1. An improved ratchet and pawl machine to prevent one part of a press or like mechanism from accidentally swinging to a home position about a first axis and relative to another part, which machine comprises

a ratchet adapted for securing in fixed relation to said one part and having a plurality of equally spaced teeth arranged along an arc that is coaxial with said first axis;

a pawl adapted for pivoting about a second axis and which is peripherally mainly defined by an arcuate bearing surface coaxial with said second axis, a tooth, and a neutral surface, the tip of said tooth being at a radius from said second axis less than the radius of said arcuate bearing surface; and



a pawl bearing for said pawl and which is fixedly secured to said another part and has an arcuate bearing surface shaped and sized to receive the pawl arcuate bearing surface;

said pawl bearing receiving said pawl arcuate bearing surface and supporting said pawl to revolve about said second axis with its tooth located to engage the teeth on said ratchet;

the sum of the ratchet root radius and the pawl tooth tip radius being greater than the distance between said first axis and said second axis.

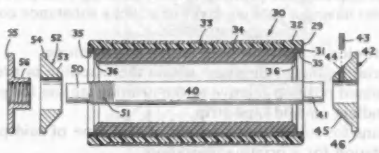
4,007,680
GRAVURE PRINTING CYLINDERS

Frank G. Pfleger, 2 Oak Place, Waldwick, N.J. 07463, and Howard Howland, 88 Clinton Place, Hackensack, N.J. 07601

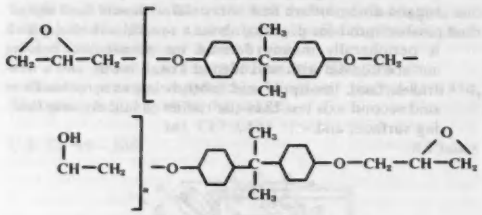
Filed July 3, 1974, Ser. No. 485,551

Int. Cl.² B41F *9/00*

U.S. Cl. 101—153 **5 Claims**



1. A gravure printing cylinder particularly for use in a gravure printing press having an impression roller forming with said cylinder a printing bite through which advances the sheet to be printed, and including means for applying printing ink to the surface of the cylinder in advance of such bite, said cylinder comprising a cylindrical body portion having an outer printing layer of hardened resinous material consisting almost entirely of an undiluted mixture of an epoxy resin and an epoxy curing agent, said resinous material having an outer smooth printing surface of uniform diameter in which are provided a multiplicity of ink carrying depressions for producing given printed images and said resinous material being substantially bubble free and having the properties characteristic of a mixture of an unmodified bisphenol-A epoxy resin, such as "Epon No. 828" having the chemical structure



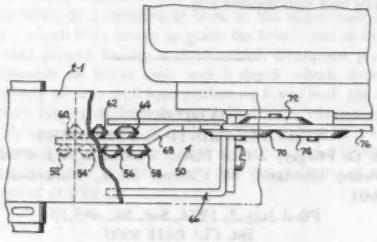
and a viscous polymide resin such as the "Epon Curing Agent V-40" derived from a dimerized fatty acid and an aliphatic polyamine, in that such mixture has a viscosity at about 70° enabling it to form said printing layer, has good adherence to aluminum, steel and phenolic body portions, and when set can be machined without chipping and then polished to a smooth finish, and that has a capability of maintaining clarity of images made with water based printing inks through prolonged printing operations exceeding 600 hours.

4,007,681

TAPE GUIDE FOR POSTAGE METER PRINTING MACHINE

James R. Swaniger, Bridgeport, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed May 16, 1975, Ser. No. 578,328
Int. Cl.² B41F *1/08*
U.S. Cl. 101—288 **2 Claims**



1. A machine for printing indicia on a tape strip of record material having a backing layer of a sticky substance comprising:

a printing station disposed within the machine,

a printing means disposed within the machine in predetermined position relative to the printing station for printing indicia on said tape strip,

means for supporting a length of said tape of said printing station for a printing operation,

means operable in response to said printing operation at said printing station for advancing the tape strip over said support means a predetermined amount to position the printed-on portion of said tape strip to be detached from the remainder of said tape strip, and

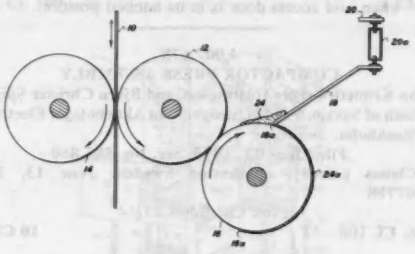
means for guiding said printed-on portion of said tape to a position for detachment from the remainder of said tape, said tape guide means including a plurality of rollers located adjacent said printing station with the axis of each roller being perpendicular to the direction of said tape advance and each of said rollers being positioned a greater distance from said printing station than the preceding roller, each of said rollers being conical in cross-section to form a knife edge on its circumference to contact the backing layer of said tape, and a portion of said plurality of rollers are of the same diameter but are connected to an inclined surface so as to deflect said tape strip upwardly along its length as the tape is placed into contact with said rollers.

4,007,682

REVERSE ANGLE MOUNTED INK-SPLITTING DOCTOR BLADE

Robert W. Gundlach, Victor, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 463,487, April 24, 1974, abandoned. This application July 7, 1975, Ser. No. 593,826
Int. Cl.² B41F *31/06*
U.S. Cl. 101—348 **1 Claim**



1. In the method of inking the surface of a cylinder to the desired ink thickness the improvement which comprises:

a. applying a flexible doctor blade, said blade having a cylindrical edge capable of splitting the ink thereby causing a portion of the ink to flow above the blade and a portion of the ink to flow beneath the blade and said cylindrical blade edge having a radius of curvative one-half of the blade thickness, to the surface of the cylinder and parallel with the axis of rotation of the cylinder to form a nip roughly the thickness of the ink film to be formed, said doctor blade being supported solely by a support member and pressed against the ink film by said support member so that the angle between the cylinder and the blade at their point of nearest approach is greater than 90° and less than 180°;

b. applying ink having a room temperature viscosity no greater than about 180,000 centipoise and a tack value no greater than about 196 as measured on a Thwing Albert 101 Inkometer to the doctor blade and causing a portion of it to flow over the edge of the blade and onto the surface of the cylinder to form an ink film on said surface which is thicker than the desired ink film thickness; and

c. providing relative motion between the surface of the cylinder and the doctor blade at a velocity adjusted to interact with the ink viscosity, blade geometry and downward force on the blade to cause the ink to be carried into the nip by such relative motion, whereby its viscous resistance to shear forces creates an upward pressure causing the doctor blade to float over the ink film it produces when a portion of the ink flows above the blade and a portion flows beneath the blade to thereby cause the ink to be applied to the surface in the desired thickness.

4,007,683

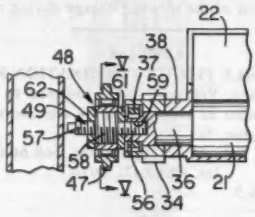
AUXILIARY DRIVE AND SPROCKET ADAPTER FOR INK FOUNTAIN ROLLER

Henry R. Dickerson, 741 S. Chase Lane, Lombard, Ill. 60148

Filed May 11, 1976, Ser. No. 685,337
Int. Cl.² B41F *31/06*
U.S. Cl. 101—363 **1 Claim**

1. In an offset lithographic machine having an ink fountain, an ink roller rotatably disposed for association with said fountain, a main drive motor, drive transmitting means connected

between said main drive motor and said ink roller for causing rotation of said roller during operation of said machine, said drive transmitting means including a drive gear element rotatably supported on said roller and a one-way clutch device drivingly connected between said driven gear element and said roller, and auxiliary drive means drivingly connected to said ink roller for causing continuous rotation thereof whenever said lithographic machine is shut down, said auxiliary drive means including an auxiliary drive motor and power transmitting means drivingly connected between said auxiliary drive motor and said ink roller for rotating same, said power transmitting means having disengageable one-way clutch means associated therewith and positionable in an engaged position for drivingly rotating said ink roller when the machine is stopped, comprising the improvement wherein said auxiliary drive means is separate and totally independent of said drive transmitting means, said auxiliary drive means including adapter means for mounting said one-way clutch means on the end of said roller so that said clutch means is separate from and totally independent of said clutch device, said adapter means including a one-piece connector shaft fixedly but re-



movably connected to the end of said roller, said connector shaft being coaxially aligned with said roller and including a threaded shaft portion which is threadably received within an opening formed in the end of said roller for fixedly but removably mounting said connector shaft to said roller, said connector shaft also including a hub portion extending outwardly from the end of said roller, said hub portion being spaced axially from said shaft portion and being of larger diameter, said one-way clutch means being concentric with and mounted on said hub portion, said one-way clutch means including an annular driven member fixed to and surrounding said hub portion and an annular driving member concentric to and surrounding said driven member, said clutch means also including overrunning clutch element means disposed between and coacting with said driving and driven member for transmitting torque from said driving member to said driven member, and said power transmitting means including an endless flexible drive element connected between said annular driving member and said auxiliary drive motor, whereby said auxiliary drive means including said connector shaft and said one-way clutch means can be attached to the ink roller of an existing lithographic machine.

4,007,684

INK LIQUID WARMER FOR INK JET SYSTEM PRINTER

Rikuo Takano, Musashino, and Yuji Sumitomo, Nara, both of Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo and Sharp Kabushiki Kaisha, Osaka, both of, Japan

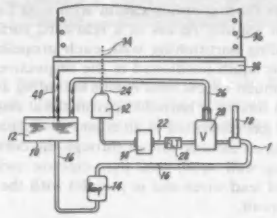
Filed Sept. 26, 1974, Ser. No. 509,549

Claims priority, application Japan, Sept. 26, 1973, 48-108778

Int. Cl.² B41F *31/02*; G01D *15/16*

U.S. Cl. 101—366 **5 Claims**

1. In an ink liquid supply system for an ink jet system printer of the charge amplitude controlling type which emits ink droplets from a nozzle toward a recording paper, selectively deflects said ink droplets by a deflection means, and prints desired symbols on said recording paper with said deflected ink droplets, said ink liquid supply system being provided with an ink liquid reservoir for containing the ink liquid therein, conduit means for connecting said ink liquid reservoir with said nozzle and means for supporting ink liquid through said conduit to said nozzle, the improvement which comprises warmer means for warming the ink in said ink supply system to a predetermined temperature in order to stabilize the viscosity and surface tension of said ink liquid supplied to said nozzle,



said warmer means being disposed in the path of said conduit means and comprising cavity means for detaining ink liquid therein, inlet means coupled to said conduit means for introducing ink liquid into said cavity means and outlet means coupled to said conduit means for permitting the flow of ink liquid from said cavity means, wherein said cavity means, inlet means, and outlet means are formed in a substantially flat block and said block is sandwiched between a pair of plates, each of said plates containing heater means.

4,007,685

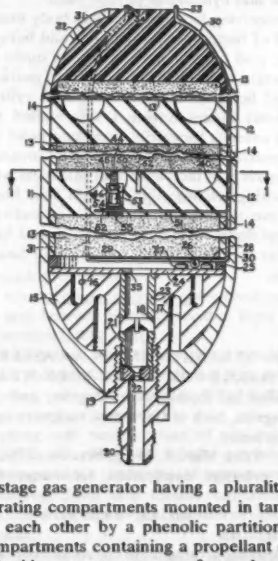
GAS GENERATOR

Osyp Nimylowycz, Philadelphia, Pa., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed July 30, 1975, Ser. No. 600,349

Int. Cl.² F42B *3/04*

U.S. Cl. 102—39 **5 Claims**



1. In a multi-stage gas generator having a plurality of individual gas generating compartments mounted in tandem and separated from each other by a phenolic partitioning wall, each of said compartments containing a propellant disc,

a first one of said compartments at a forward end of said generator and containing a propellant charge, a first electric squib in contact with said propellant charge, and electric wire means in contact with said first squib and extending in substantially opposed directions,

a pair of spaced apart electric lead wires respectively in contact with end portions of said electric wire means and extending longitudinally along substantially opposed sidewall portions of said generator to an outlet remote from said forward end for establishing an electric circuit through said first squib,

each partitioning wall containing a filtering slot in fluid communication with a forward unidirectional gas plug, a propellant charge and an electric squib in contact therewith and in fluid communication with said filtering slot through an annular recess in a rearward surface of the corresponding partitioning wall, each propellant charge and electric squib positioned in the respective partitioning wall annular recess, and means including a pyro-electric switch having a burnable pyrotechnic responsive to propellant gas generated in an adjacent compartment for establishing an electric circuit through the corresponding partitioning wall squib and pyro-electric switch across said pair of lead wires and in parallel with the first squib electric circuit,

so constructed and arranged that selective sequential initiation of said compartment propellant charges is available as a pulsing gas generator.

4,007,686

CARTRIDGE CASING

René Gérard Hugonet, 36, rue Saint-Antoine, 91770 Saint-Vrain, France

Filed Mar. 26, 1975, Ser. No. 562,142

Claims priority, application France, Apr. 8, 1974, 74.12237

Int. Cl.² F42B *5/26*

U.S. Cl. 102—44 **6 Claims**

1. A cartridge case comprising:

a metal head, said head including a cylindrical forward portion, a base portion oriented generally transverse to the axis of said cylindrical portion and a rim portion interconnecting said base and cylindrical portions, said rim portion extending outwardly with respect to said cylindrical portion to define a circular groove facing said axis of said cylindrical portion; and

charge receiving body means, said body means being comprised of thermoplastic material and being of cylindrical shape, said body means having an outer diameter commensurate with said head cylindrical portion inner diameter and being received in said head cylindrical portion, said body means having a thin walled tubular portion which extends forwardly from said head cylindrical portion coaxially therewith, said body means also having a base portion of increased wall thickness which terminates in abutting relationship with said head base portion, said body means base portion having an outwardly extending integral flange which is engaged in said head rim portion circular groove thereby locking said head to said body means.

4,007,687

PRIMING ARRANGEMENT IN A CASELESS POWDER CHARGE FOR SMALL-BORE WEAPONS

Helmut Könicke, Rothenbach, Pegnitz, and Anton Politzer, Lauf, Pegnitz, both of Germany, assignors to DIEHL, Nurnberg, Germany

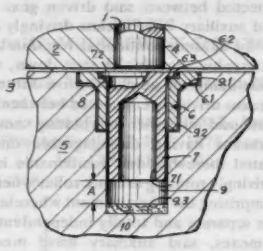
Filed Mar. 5, 1975, Ser. No. 556,337

Claims priority, application Germany, Mar. 6, 1974, 2410622

Int. Cl.² F42B *9/16*

U.S. Cl. 102—45 **6 Claims**

1. In a priming arrangement for small-bore weapons, including a powder charge having a bore for receiving a primer cap and a primer pad; and a firing pin; said primer pad being adapted to be exploded by said primer cap responsive to the latter being impacted by said firing pin by movement of said firing pin, the improvement comprising: a cylindrical sleeve in said bore, said primer cap being slidably located in said cylindrical sleeve, said firing pin being positioned to enter said cylindrical sleeve during firing movement thereof towards said primer cap, said cylindrical sleeve being constituted by a low heat-conductive, difficultly combustible material to provide insulation of the firing pin from said powder charge thereby preventing ignition of the powder charge during misfire.



4,007,688

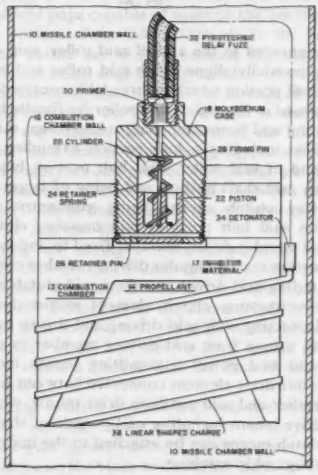
TIMED MISSILE FLIGHT TERMINATION SYSTEM

David Bruce Franz, Ventura, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 23, 1976, Ser. No. 660,604

Int. Cl.² F42C *9/10*

U.S. Cl. 102—49.5 **9 Claims**



1. A pressure activated, timed missile flight termination system comprising:

a. threaded casing means for insertion in a combustion chamber wall of said missile;

b. a cylindrical piston disposed within a cylinder formed in said threaded casing means;

c. a primer detachably connected to said threaded casing means;

d. pin means connected to said cylindrical piston for penetrating said primer and causing said primer to ignite whenever said cylindrical piston is compressed due to a pressure buildup in said combustion chamber;

e. a pyrotechnic delay fuse connected to said primer;

f. detonation means connected to said primer for causing a detonation when ignited by said delay fuse;

g. linear-shaped charge means wrapped around said missile for severing said missile into a plurality of pieces in response to said detonation of said detonation means;

wherein said pressure buildup in said combustion chamber occurs instantaneously upon ignition of said missile and said pyrotechnic delay fuse provides a predetermined delay before ignition of said detonation means so that said missile is automatically destroyed after a predetermined flight period.

4,007,689

BLOCKING MECHANISM FOR AN IMPACT FUZE

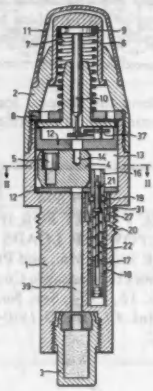
Robert Apothéloz, Greifensee, Switzerland, assignor to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG, Zurich, Switzerland

Filed June 14, 1976, Ser. No. 696,067

Claims priority, application Switzerland, June 27, 1975, 8367/75

Int. Cl.² F42C *1/04, 15/24*

U.S. Cl. 102—78 **4 Claims**



1. A blocking mechanism for an impact fuze comprising a fuze housing, a blocking sleeve mounted to be lengthwise displaceable within the fuze housing, means for spring-loading the blocking sleeve, said blocking sleeve being provided with at least one radially movable blocking body, a blocking bolt lengthwise displaceable within the blocking sleeve for bringing the blocking body into a position blocking the blocking sleeve in the fuze housing, means for spring-loading the blocking bolt, said fuze housing having a recess into which there can engage the blocking body for blocking the blocking sleeve in a first position, said fuze housing having a further substantially wedge-shaped recess tapering towards the rear of the fuze housing, said further recess having a wall, the blocking body in a second position of the blocking sleeve being clampable between the wall of the further recess and the blocking bolt for securing the blocking bolt against rearward displacement.

4,007,690

PRACTICE BOMB SIGNAL FOR DAY OR NIGHT OPERATION

John E. Wildridge, Washington, Ind., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 21, 1975, Ser. No. 634,212

Int. Cl.² F42B *11/16*

U.S. Cl. 102—87 **4 Claims**

1. A signal cartridge for use in a practice bomb for indicating a point of impact comprising,

a cartridge case,

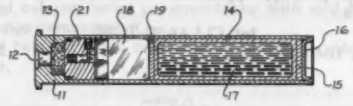
a primer in said cartridge case arranged to be detonated by a first firing pin,

an expelling charge adjacent said primer,

a quantity of marking material within said cartridge case for forming a signal cloud upon discharge from said cartridge case by said expelling charge,

a percussively-ignitable flashcube within said cartridge case, and

means for flashing said flashcube after said flashcube is expelled from said cartridge case, said means including a



second firing pin engageable with said flashcube and a bore rider pin for preventing actuation of said second firing pin until said bore rider pin passes the end of said cartridge case.

4,007,691

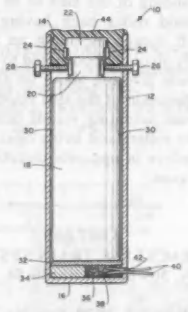
SMOKE MARKER

Frederick L. Haake, Oxnard, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 23, 1975, Ser. No. 643,713

Int. Cl.² F42B *4/00*

U.S. Cl. 102—90 **10 Claims**



1. A smoke marker comprising:

a. a seamless tubular housing having one closed end and one open end, said housing being fabricated from an explosive-proof material;

b. a closed, collapsible, tubular container having a neck portion, said tubular container being disposed in said tubular housing, said container being filled with a column of smoke generating chemical;

c. means abutting said neck portion of said tubular container for rigidly attaching said tubular container to said tubular housing and for shearing said neck portion of said tubular container from said tubular container when a sufficient force is applied to said column of smoke generating chemical;

d. means disposed between said tubular container and said closed end of said tubular housing for generating and applying said sufficient force to said column of smoke generating chemical such that said neck portion of said tubular container and said column of smoke generating chemical are ejected from said tubular container.

4,007,692

BRAKING DEVICE FOR SLEDS FOR SLIDING PATHS

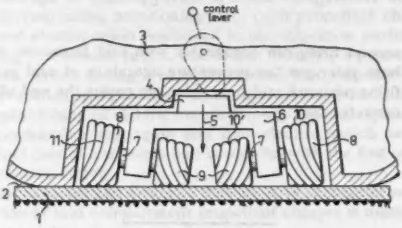
Manfred Kunz, Korbach, Germany, assignor to Continental Gummi-Werke Aktiengesellschaft, Hannover, Germany

Filed May 19, 1975, Ser. No. 579,020

Claims priority, application Germany, May 17, 1974, 2424074

Int. Cl.² A63G *21/00*

U.S. Cl. 104—134 **2 Claims**



1. A braking device for use in connection with a sled for a sliding path, which includes in combination: braking means comprising roller means operable to engage the sliding path on which said braking device is to slide, and actuating means operatively connected to said roller means to move said roller means from a non-braking position into a braking position for braking engagement with the sliding path over which a sled equipped with said braking device is to slide, said roller means including at least two rollers and also including shaft means fixedly connected to said rollers, means operatively connected to said shaft means and operable to brake the latter to thereby brake said rollers, the central plane in the circumferential direction of said roller means differing from the desired normal direction of sliding of the sled to be equipped with said braking device, said roller each having a conical running surface, said shaft means including an axle with said two rollers respectively pivotally connected to the two ends of said axle for respectively pivoting about an axis extending in the intended sliding direction of the sled equipped with said braking device, and said actuating means being operatively connected to said two rollers and being operable simultaneously to tilt said two rollers in opposite direction relative to each other about said axes.

4,007,693

TRACKLESS TRAIN SYSTEM

Bernard Desourdy, 309 de Normandie St., Longueuil, Quebec, Canada

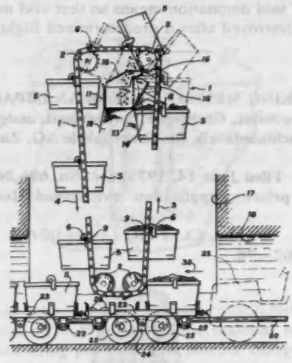
Filed Sept. 25, 1975, Ser. No. 616,823

Claims priority, application Canada, July 11, 1975, 231289

Int. Cl.² B61B *13/04*

U.S. Cl. 105—144 **2 Claims**

1. A transportation system for the evacuation of muck from a tunnel of substantially circular cross-section is a tunneling operation, said tunnel including a utility pipe secured to the wall of the tunnel and extending substantially parallel to the deepest longitudinal portion of the tunnel laterally of said portion and at a substantially constant level above the same, said transportation system comprising a train of interconnected cars, each car including a horizontally disposed frame, at least one open top much-receiving receptacle carried by said frame, a pair of load carrying wheels disposed in a single longitudinal row along the centre line of the frame below the same and adapted to run on suspension connecting the pair of load carrying wheels to the car frame, brackets extending from both end portions of the car frame laterally from one side only of the car frame, and sets of guide wheels rotatably carried by each bracket, said guide wheels having a peripheral groove for receiving said pipe in rolling engagement therewith, first guide wheels of each set rolling on the top of the pipe and second guide wheels of the set rolling along the bottom of the pipe, said guide wheels laterally guiding the



corresponding car along the deepest longitudinal portion of the tunnel and preventing lateral and longitudinal tilting of the car.

4,007,694

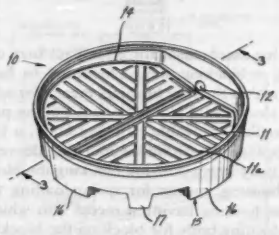
UNITARY PLASTIC PALLET FOR HANDLING HEAVY POWDER LOADS

Timothy J. Fowler, St. Louis, Mo., and Paul G. Kanan, Watertown, Mass., assignors to Monsanto Company, St. Louis, Mo.

Filed Feb. 15, 1974, Ser. No. 442,967

Int. Cl.² B65D *19/04*

U.S. Cl. 108—55.1 **2 Claims**



1. A load carrying pallet comprising a hollow, unitary plastic structure having a reinforced, substantially rigid lower deck, a flexible, reinforced and substantially continuous upper deck separated from said lower deck but deformable under normal loads to rest on said lower deck, the reinforcements on said lower deck and said upper deck being disposed in essentially parallel planes but being nonparallel in direction, an exterior wall extending above said upper deck and bridging said upper and lower decks, and a plurality of reinforced legs integrally associated with said lower deck while adapted to permit forklift transport of said pallet, said upper deck and lower deck being substantially parallel to each other but inclined with respect to the bottom surface of the pallet legs.

4,007,695

ROTARY HEARTH FURNACE

Jim Frye, 4304 N.W. 56th St., Oklahoma City, Okla. 73112

Filed Oct. 17, 1975, Ser. No. 623,426

Int. Cl.² F23G *5/00*; F23B *1/24*; F27B *9/16*

U.S. Cl. 110—13 **22 Claims**

1. A rotary hearth furnace comprising:

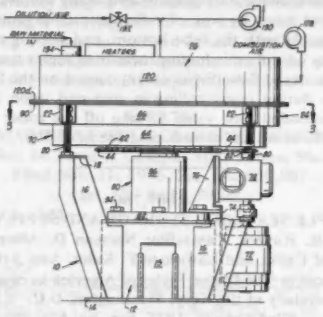
a refractory lined, generally circular turntable having a generally flat upper surface, and having a discharge opening in the center of said upper surface;

drive means drivingly engaging the turntable for driving the turntable in rotation;

hood means covering the turntable;

a primary scraper blade positioned over the turntable and within the hood means, said primary scraper blade extending chordally across said turntable at a location spaced radially outwardly from said discharge opening, and said primary scraper blade having a lower edge immediately adjacent the upper surface of said turntable extending part of the way across said turntable from the peripheral outer edge thereof, said primary scraper blade further having a slot therein at the lower side thereon and extending from one end of said lower edge toward a peripheral outer edge of said turntable; and

a secondary scraper blade positioned over said turntable and within said hood means, said secondary scraper blade extending chordally across said turntable at a location spaced radially outwardly from said discharge opening, and spaced from said primary scraper blade, said secon-



dary scraper blade having a lower edge immediately adjacent the upper surface of said turntable and extending part of the way across said turntable, said secondary scraper blade having a pair of slots therein at the lower side thereof, with said slots being spaced from each other by the lower edge of said secondary scraper blade, and with one of said slots positioned to permit material moving on said turntable as said turntable rotates to pass through said one slot and then engage said primary scraper blade at a location spaced therealong from the slot in said primary scraper blade;

means for depositing waste material to be incinerated through said hood means on said turntable at a location on the opposite side of said primary scraper blade from said secondary scraper blade and adjacent the portion of said primary scraper blade which carries said lower edge; and

heater means in said hood means for directing heat against a waste material positioned on the upper surface of said turntable for incineration.

4,007,696

SOLID FUEL CONVERSION FURNACE

Richard L. Robertson, Rte. 1 Box 486c, Port Orchard, Wash. 98366

Filed Oct. 1, 1975, Ser. No. 619,141
Int. Cl.² C10B *57/00*; **F23B** *1/36*
U.S. Cl. 110—31 **6 Claims**

1. A furnace comprising:

a. a sealable fuel compartment;

b. a fire compartment;

c. a heat exchange compartment;

d. means for loading fuel into said sealable fuel compartment wherein said fuel is exposed to a non-combustion supporting atmosphere;

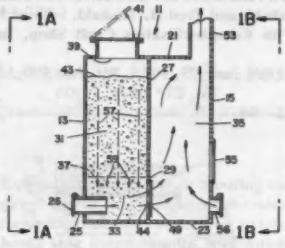
e. said heat exchange compartment being in heat exchange relationship with said fuel compartment;

f. said fire compartment being positioned under said fuel compartment;

g. said fire compartment including an air inlet and an exhaust outlet;

h. said exhaust outlet communicating with said heat exchange compartment;

i. said heat exchange compartment having an exhaust gas flue;



j. said means for loading fuel is sealably connected to said fuel compartment and prevents air from entering said fuel compartment;

k. heat from said heat exchanger causes solid fuel in said fuel compartment to convert into combustible gases and combustible solids whereby;

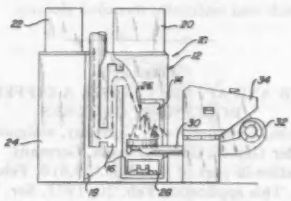
l. said combustible solids are transmitted to said fire compartment by gravity action and said combustible gases are transmitted to said fire compartment by self-generated pressure.

4,007,697

STOKER ACTUATED COAL BURNING APPARATUS

LeRoy W. Prill, Ranchester, Wyo., assignor to Prill Manufacturing Company, Sheridan, Wyo.

Filed Oct. 2, 1975, Ser. No. 619,076
Int. Cl.² F23K *3/18*
U.S. Cl. 110—45 **17 Claims**



1. Stoker actuated coal burning apparatus comprising:

a feed box having a generally horizontal intake port for connection to a fuel-feeding stoker mechanism and a generally vertical discharge port for transmission of coal to a burning zone;

an annular burner body mounted on the feed box and having a central annular vertically directed delivery ring in coaxial communication with the discharge port, and an annular burner grid connected to the upper end of the delivery ring and sloping outward and downward;

and an annular ash ring having an inner marginal portion overlying the outer marginal portion of the burner grid and an outer portion extending outward beyond the grid, with the upper surface sloping outward and upward to define with the grid surface an annular recess for retaining burning coal;

the inner marginal portion of the ash ring resting directly on

the outer marginal portion of the grid to prevent discharge of ashes at their juncture, and the outer marginal portion of the grid serving as a bearing for rotational support of the ring;

the burner body being restrained against rotation;

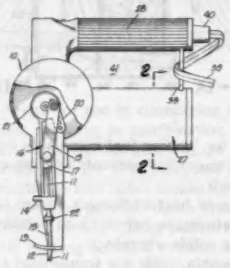
and the ash ring being rotatable about the vertical axis of the burner body.

4,007,698

MOTOR DRIVEN TUFTING MACHINE

Fred A. Thaheld, and Fred H. Thaheld, both of Minden, Nev., assignors to Rumplestiltskin's Craft Shop, Inc., Portland, Oreg.

Filed June 25, 1975, Ser. No. 590,325
Int. Cl.² D05C *15/06*
U.S. Cl. 112—80 **1 Claim**



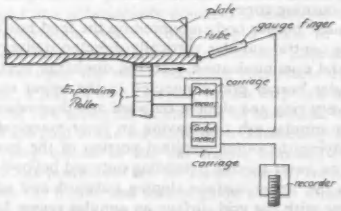
1. In a hand held power operated tufting machine having concentric needles for forming loops of yarn on a backing sheet, the combination of: mechanism for reciprocating and oscillating said needles, an electric motor for driving said mechanism, said motor being mounted within and enclosed by a housing formed of lightweight plastic material, said housing having a plurality of inwardly projecting bosses each formed integrally with said housing, each boss having an opening receiving an internally threaded metal sleeve, an annular metal reinforcing ring completely encircling the projecting end of each boss to confine an annular region thereof between the ring and said sleeve, and threaded fasteners securing said motor to each said internally threaded sleeves.

4,007,699

METHOD AND APPARATUS FOR A DIFFERENTIAL ROLLING-IN OF TUBES

Kurt Clemens, Gummersbach, Germany, assignor to L. & C. Steinmuller GmbH, Gummersbach, Germany

Continuation-in-part of Ser. No. 329,610, Feb. 5, 1973, abandoned. This application Feb. 20, 1975, Ser. No. 551,257
Claims priority, application Germany, Feb. 4, 1972, 2205281
Int. Cl.² B21D *53/02*
U.S. Cl. 113—118 C **17 Claims**



5. An apparatus for differentially rolling-in a tube into plates and walls, especially of heat exchangers, according to which the tube section to be rolled-in is widened, which includes in combination roller means adapted to be introduced into the tube section to be flow expanded, driving means operatively connected to said roller means for actuating the same, and control means operatively connected to said driving means for controlling the latter with regard to the measurement of length of the tube section produced by rolling-in movement of said roller means, said control means including measuring means responsive to elongation of said tube section by said roller means, said roller means widening said tube section to decrease the thickness of said tube, so that said tube section is elongated to actuate said control means.

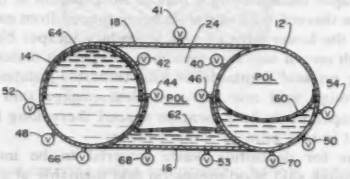
11. A method for measurement of adherence enlargement by way of material expansion arising during tight rolling-in of tubes in a tube bottom especially for heat exchangers through widening of tube segments to be rolled-in, comprising in combination steps of seal-rolling the tube in several individual increments beginning with the first step along the tube bottom inner side pressing the tube securely against the tube bottom without adherence enlargement and being connected during subsequent steps by way of adherence enlargement sealing unreleaseably with the tube bottom, and sensing tube length change by way of an inductive measuring feeler means only as to tube material flow displacement caused on the face side of the tube during every rolling-in step and upon attaining a pre-set intended flow value turning off the roller motor, reversing the same and introducing the next step.

4,007,700

MULTIPLE SEAFLOOR STORAGE AND SUPPLY SYSTEM

Harvey H. Haynes, Camarillo; Norman D. Albertsen, Ojai, both of Calif., and Lawrence F. Kahn, Ann Arbor, Mich., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 28, 1975, Ser. No. 626,386
Int. Cl.² B63B *25/08*
U.S. Cl. 114—74 T **13 Claims**



1. A mobile seafloor storage structure for storing a storage fluid therein comprising:

a. a plurality of cylindrically shaped enclosures having substantially hemispherical-shaped end members, said cylindrically shaped enclosures being adapted to contain said storage fluid;

b. means disposed between at least two of said cylindrically shaped enclosures for forming a second enclosure, said second enclosure being adapted to contain said storage fluid;

c. valve means for fluidically connecting each said cylindrically shaped enclosure to or fluidically disconnecting each said cylindrically shaped enclosure from said second enclosure such that said storage fluid may be utilized to shift both the center-of-gravity and the center-of-buoyancy of said seafloor storage structure;

d. means for injecting said storage fluid into and removing said storage fluid from said cylindrical enclosures and said second enclosure;

e. means disposed inside each said cylindrically shaped enclosure and inside said second enclosure for creating an upper compartment and a lower compartment therein, said upper compartment adapted to contain said storage

fluid, said lower compartment adapted to contain seawater or a gas;

f. first valve means for injecting seawater into and removing seawater from said lower compartment of each said cylindrically shaped enclosure and said second enclosure;

g. second valve means capable of passing a gas into and out of said lower compartment of each said cylindrically shaped enclosure.

10. A method of raising and lowering a mobile underwater seafloor storage structure comprising a pair of cylindrically shaped enclosures having hemispherical-shaped end members, said cylindrically shaped enclosures being connected by a top, bottom and side members such that a second enclosure is formed between said pair of cylindrically shaped enclosures, the longitudinal axes of said cylindrically shaped enclosures being parallel; comprising the steps of:

a. filling both said cylindrically shaped enclosures with a storage fluid bearing said second enclosure empty;

b. draining the storage fluid from one said cylindrically shaped enclosure into said second enclosure so that said cylindrically shaped enclosures are disposed vertically;

c. attaching a lowering line to said structure;

d. placing a ballast in one end of said cylindrically shaped enclosure such that said structure tilts in the water; and

e. rendering said structure negatively buoyant.

4,007,701

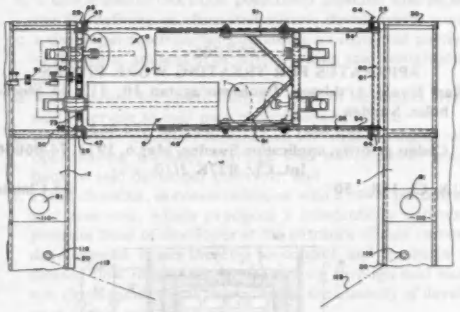
MARINE VESSEL SCRUBBING DEVICE

Don G. Fike, 16 Town & Campus Apt., Fulton, Mo. 65251

Filed Nov. 11, 1975, Ser. No. 630,807

Int. Cl.² B63B *59/00*

U.S. Cl. 114—222 **5 Claims**



1. In a marine vessel bottom cleaning device wherein a floating platform has spaced ways between which a vessel to be cleaned passes lengthwise thereof and scrubbing means are supported on said platform, the improvement comprising at least two elongate scrubbing means spaced from one another lengthwise of said ways, extending in a direction generally athwart said ways and toward one another and in at least one position overlapping one another along the lengthwise path of said vessel, and means for moving said scrubbing means relative to one another from said position at which they overlap one another along the lengthwise path of said vessel in a direction outboard of said vessel and away from one another, said moving means being selectively actuable to move said scrubbing means independent of the presence of a vessel between said ways, said platform comprising an outside frame and an inside frame, said inside frame comprising said moving means, being located between said ways and having a traversing scrubbing means support by which at least one of said elongate scrubbing means is carried, and means for moving said inside frame scrubbing means support transversely of the lengthwise path of the vessel to move said elongate scrubbing means toward and away from another elongate scrubbing means.

4,007,702

TOWING ETC. CABLE PROTECTION MEANS

Wilfred Johnson Cave, and Edward George Culver, both of Sheffield, England, assignors to Hallam Polymers & Engineering Limited, United Kingdom

Filed Sept. 5, 1974, Ser. No. 503,456

Claims priority, application United Kingdom, Sept. 19, 1973, 43882/73

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² B63B *21/00*

U.S. Cl. 114—230 **9 Claims**

1. Means for protecting a towing or mooring cable comprising an elongated sleeve of resilient wear-resistant material with at least one longitudinally extending external flat face, said sleeve being split longitudinally into individual unitary sleeve parts which define a cable receiving longitudinal guideway therebetween the exposed surface of which is comprised of said resilient wear-resistant material, said sleeve parts including a metal strap bonded and imbedded within each of said sleeve parts behind said exposed surface of said guideway so as to remain out of contact with a cable placed through said guideway, said metal straps being positioned adjacent each end of said elongated sleeve, holes extending through each end of the metal straps, holes extending through said sleeve parts which are coaxial with the holes in said straps, and screw means extending through each coaxial pair of holes to secure said sleeve parts together.

4,007,703

TWO-TONE SOUND GENERATOR

Domenico Frigo, Olmo, Italy, assignor to F.I.A.M.M. Fabbrica Italiana Accumulatori Motocarri Montecchio S.p.A., Montecchio Maggiore (Vicenza), Italy

Filed Feb. 27, 1976, Ser. No. 662,169

Int. Cl.² G10K *9/18*

U.S. Cl. 116—142 FP **10 Claims**

1. A two-tone signal generator comprising:

a hollow body divided into two complementary half-shells meeting along a median plane;

a curved septum dividing the interior of said body into two convoluted wind channels of different length each bisected by said median plane, said wind channels terminating in a common bell open to the exterior, said half-shells forming a common inlet for said wind channels, said inlet including a central duct bisected by said median plane and two lateral branches with confronting internal shoulders forming a generally T-shaped junction with said duct;

a mobile valve member in said junction freely displaceable between said shoulders for blocking either of said branches upon a blowing of air under pressure into the opposite branch; and

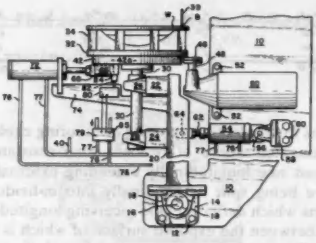
guide means in each of said half-shells for directing incoming air from said central duct to an end of a respective wind channel remote from said bell.

4,007,704

GASKET MATERIAL APPLICATOR

Girard S. Haviland, West Hartford, Conn., assignor to Loctite Corporation, Conn.

Filed Feb. 14, 1975, Ser. No. 549,865
Int. Cl.² B05C *13/00*, *5/00*
U.S. Cl. 118—6 **10 Claims**



1. The combination comprising:

a turntable having means for fixedly supporting a work piece;

means supporting said turntable for rotation about a rotational axis and for movement in a plane extending in a direction transverse to said rotational axis, said supporting means including a support arm and means supporting said arm for swinging movement about an axis normal to said plane, said turntable being rotatably supported by said support arm at a location remote from said last mentioned axis;

a cam wheel connected to said turntable for rotation therewith and for movement therewith in said plane;

said cam wheel having a peripheral edge surrounding said rotational axis at varying distances therefrom;

a drive means having a portion moving at a constant linear speed in driving engagement with said peripheral edge of the cam wheel at a fixed first location in said plane; and

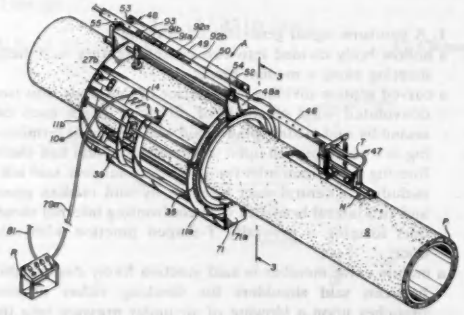
means yieldably urging said cam wheel into peripheral driven engagement with said drive means.

4,007,705

APPARATUS FOR TREATING A CYLINDRICAL OBJECT

C. Richard Sherer, and Jack Webber, both of Houston, Tex., assignors to DND Corporation

Filed Dec. 20, 1974, Ser. No. 534,661
Int. Cl.² B05C *5/00*
U.S. Cl. 118—7 **37 Claims**



1. Apparatus for temporary positioning about a generally cylindrical object for indexing a tool across the surface thereof, comprising:

a frame assembly and means for temporarily opening said frame assembly to receive a cylindrical object;

a boom assembly including a boom and a boom head, said boom head including tool mount means adapted to mount a tool for movement with said boom head;

indexing means for moving said boom assembly longitudinally and circumferentially of said pipe surface thereby positioning said tool to perform a designated treatment on said cylindrical object;

said indexing mans including rotation hydraulic control means for moving said boom assembly through a predesignated angular increment and boom hydraulic control means for moving said boom assembly through a predesignated length of movement in first and second longitudinal directions; and

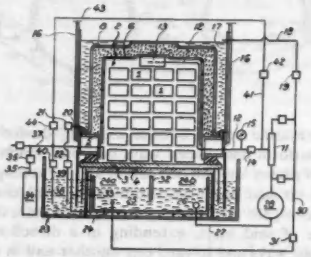
said index means including intercontrol means operatively interconnecting said rotation hydraulic control means and said boom hydraulic control means for operating said boom assembly for movement longitudinally and circumferentially in any desired time relationship.

4,007,706

APPARATUS FOR TREATING WORK PIECES

Karl Ewald Arvidsson, Dannemoragatan 10, 113 44 Stockholm, Sweden

Filed May 6, 1975, Ser. No. 574,962
Claims priority, application Sweden, May 6, 1974, 74-06006
Int. Cl.² B27K *3/10*
U.S. Cl. 118—50 **13 Claims**



1. Apparatus for treating workpieces in an enclosed space, said apparatus comprising:

a. workpiece-supporting means having a workpiece-supporting surface;

b. a rigid framework in proximity to and coextensive with edge portions of said workpiece-supporting surface, said framework having a side facing said workpiece-supporting surface;

c. a collapsible material secured to said framework defining an enclosed space over the workpiece-supporting surface;

d. a plurality of spaced posts secured to said framework; and

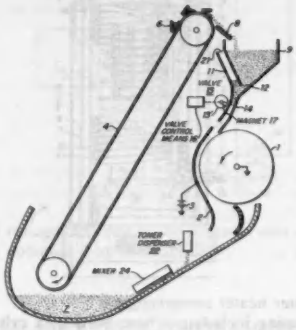
e. wall members secured to and supported by said spaced posts extending continuously about said framework, said wall members together with said collapsible material defining between them a liquid-tight chamber.

4,007,707

XEROGRAPHIC DEVELOPMENT APPARATUS HAVING A LARGE RESERVOIR FOR CONTROLLED FLOW THROUGH A NARROW DEVELOPMENT ZONE

W. Raymond Buchan, Lincoln, and Edward F. Mayer, Acton, both of Mass., James E. Gentle, Newton, Conn., assignors to Itek Corporation, Lexington, Mass.

Filed Jan. 21, 1975, Ser. No. 542,886
Int. Cl.² B05B 5/02; G03G 15/00
U.S. Cl. 118—647 4 Claims



1. A xerographic development apparatus for a xerographic machine comprising:
   a. a xerographic member capable of carrying an electrostatic image;
   b. a development electrode positioned adjacent said member for defining an elongated narrow development zone;
   c. a developer reservoir for containing a substantial portion of the entire amount of developer within said xerographic machine;
   d. valve means for controlling the flow of developer from said reservoir to said narrow development zone;
   e. a developer transport mechanism for transporting developer having travelled through said development zone back to said developer reservoir; and
   f. a feed chamber, in communication with a lower portion of said reservoir, which produces a substantially constant pressure head of developer at the entrance of said narrow development zone, thereby to control and maintain a desired flow rate of developer passing through said narrow development zone regardless of the quantity of developer within said reservoir.

4,007,708

ANIMAL LITTER PRODUCT

Catherine L. Yacono, 44 W. 31st Place, Steger, Ill. 60475

Continuation of Ser. No. 478,039, June 10, 1974, abandoned.
This application July 24, 1975, Ser. No. 599,008
Int. Cl.² A01K 29/00; 119 1
U.S. Cl. 119—1 7 Claims

1. An animal litter product including a particulate litter material absorbent for liquids that is harmless to warm blooded animals and which comprises an inorganic absorbent of the nature of clay and an odor inhibiting quantity of vitamin E absorbed therein in an approximate amount of about 0.25–5% by weight of the particulate litter material.

4,007,709

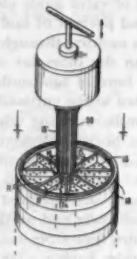
APPARATUS AND PROCESS FOR RAISING LOBSTERS

Frederick B. Wishner, 30 E. 40th St., New York, N.Y. 10016

Filed Mar. 24, 1975, Ser. No. 561,089
Int. Cl.² A01K 61/00
U.S. Cl. 119—2 15 Claims

1. A lobster raising apparatus comprising at least one covered sectioned tray, each tray having a single hollow aeration and feeding tube passing therethrough, which hollow tube passes through the center of each tray; the sections of each tray being divided by walls which prevent growing lobsters from migrating from one section to another; there being a plurality of holes in said hollow tube and said divider walls and the floors of each tray of a size too small to permit post-larval and larger lobsters to pass therethrough, there being present in said tube a pressure device for introducing air and finely divided particles of lobster diet through said holes in said hollow tube and into said sections of each tray.

9. A process for maintaining and raising lobsters comprising placing a plurality of post-larval lobsters underwater in a sectioned tray in a lobster raising apparatus, no more than one



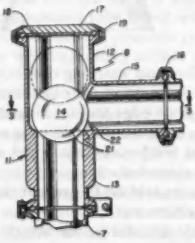
lobster in a section, said apparatus comprising at least one sectioned tray, each tray having a single hollow tube passing therethrough, which hollow tube passes through the center of each tray; the sections of each tray being divided by walls which prevent growing lobsters from migrating from one section to another; placing a feeding and aeration pressure device in said hollow tube withdrawing said pressure device from said hollow tube as pressure is applied to expel air; and passing bubbles of said air through holes in said hollow tube and in said divider walls and the floors of said trays which holes are too small to permit passage therethrough of said post-larval and larger lobsters thereby permitting the water enveloping each of said lobsters to be suitably aerated.

4,007,710

MILK LINE CHECK VALVE

Kendall R. Johnson, Albert Lea, Minn., assignor to Universal Cooperatives, Inc., Albert Lea, Minn.

Filed Feb. 27, 1976, Ser. No. 661,850
Int. Cl.² A01J 5/00
U.S. Cl. 119—14.03 9 Claims



1. In a milk line having a vertically extending portion and a horizontal portion for carrying milk vertically from a milk pump and then horizontally to a more remote location, a check valve disposed within the line comprising:
   a. a vertically extending tubular member having a sealed upper end portion and having an open lower end portion constituting a milk inlet;
   b. a horizontally extending outlet tube connected to the

upper end portion of said vertically extending tubular member in milk-receiving relation and extending at right angles outwardly therefrom and having a discharge outlet connected in milk-delivering relation to the horizontal portion of the milk line;

c. a spherical valve element carried within the bore of said upper end portion of said vertical tubular member and movable vertically therewithin;

d. said upper end portion having an open bore above said outlet tube sufficiently greater than the diameter of said valve element to permit the latter to move freely upwardly and downwardly therewithin and being sealed at a level above said outlet tube a distance at least substantially as great as the diameter of said valve element and being devoid of valve guide elements;

e. said lower end portion of said tubular member having a bore which is uniform throughout its length and of lesser diameter than the diameter of said valve element and equal to the bore of said outlet tube and having a milk inlet connected to the vertically extending portion of the milk line in milk-receiving relation;

f. a cooperative horizontally extending circular valve seat carried by said lower end portion immediately adjacent to said outlet tube and having a diameter smaller than the diameter of said valve element and cooperating therewith to seal off said lower end portion of said tubular member against a return flow from said outlet tube;

g. said outlet tube having a uniform bore throughout its length and lesser in diameter than said valve element and defining a discharge port in the side wall of said upper portion of said tubular member, said discharge port being of such diameter and constructed and shaped to preclude said valve element from entering said outlet tube and from effectively sealing off the flow of milk upwardly through said lower portion into said outlet tube.

4,007,711

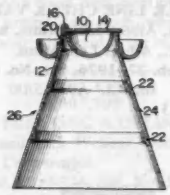
ANTI-PEST PET DISH

John E. Michael, 2530 Cherry Lane, Walnut Creek, Calif. 94596

Filed May 2, 1975, Ser. No. 573,963

Int. Cl.² A01K *5/00*

U.S. Cl. 119—51.5 **3 Claims**



1. A pet feeding and watering dish comprising:

a. a central bowl portion for containing pet food;

b. a lid having one edge thereof hinged to said bowl portion and an edge opposite said one edge which extends beyond said central bowl such that a pet can raise said lid by lifting said extended edge;

c. stop means on said lid to prevent the raising thereof to a vertical position; and

d. a removable annular water trough portion surrounding encircling said central bowl portion to provide water accessible to a pet and prevent access to said bowl portion by crawling insects and permit the separation of said water trough portion from said bowl portion for washing,

e. said central bowl portion having an outwardly tapered skirt and said trough having a complementary tapered radially inner wall such that when placed around said skirt said trough portion is maintained thereon by friction and gravity.

4,007,712

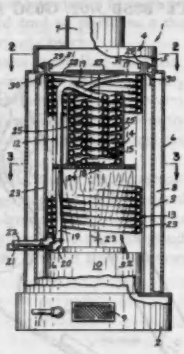
WATER HEATER

John F. Finger, and Merle E. Pochop, both of Beresford, S. Dak., assignors to Sioux Steam Cleaner Corporation, Beresford, S. Dak.

Filed Mar. 3, 1976, Ser. No. 663,613

Int. Cl.² F22B *27/08*; **F23M** *9/06*

U.S. Cl. 122—250 R **9 Claims**



1. A water heater comprising:

a. a housing including a base portion, a cylindrical body portion, and an upper end member defining an opening for removal of gases of combustion;

b. a burner disposed at said base portion and disposed to direct a combustion flame upwardly in said housing;

c. a rigid fluid conduit in said housing;

d. means for supporting said conduit above the level of said burner;

e. said conduit being formed to provide an interconnected plurality of concentric helical coils including an outer coil of relatively long axial length and an inner second coil of relatively shorter axial length within said outer coil, said second coil having an upper end disposed near the upper end of said outer coil;

f. a generally horizontally disposed reticulate baffle having a diameter slightly less than the inner diameter of said outer coil;

g. and means for supporting said baffle within said outer coil at the lower end of said second coil;

h. said baffle and the lower end portion of said outer coil cooperating with said burner to define a combustion chamber, said baffle being operative to permit flow of gases of combustion upwardly therethrough while retaining the greater portion of the burner flame within the combustion chamber.

4,007,713

TEST CIRCUIT

Michael J. DeLeonardis, and Donado DeLeonardis, both of Valley Stream, N.Y., assignors to Hydrolevel Corporation, Farmingdale, N.Y.

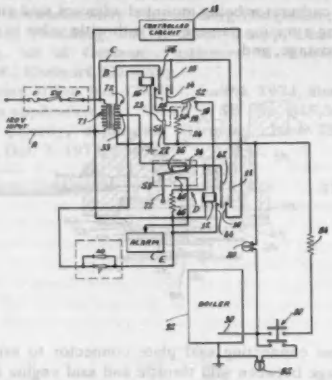
Filed Aug. 28, 1975, Ser. No. 608,552

Int. Cl.² F22B *37/42*

U.S. Cl. 122—504 **5 Claims**

1. In a control circuit including a branch having a water path through which electrical current normally flows, the improvement for detecting a short circuit around said water path which comprises: a test switch having normally open first and normally closed second contacts, said normally closed

second contacts being in series with said branch; a voltage indicator; and means connecting said normally open first



contacts and voltage indicator in series across said water path to indicate a potential drop thereacross.

4,007,714

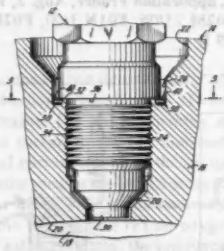
SPARK PLUG AND ROTARY ENGINE COMBINATION

Charles Jones, Hillsdale, N.J., assignor to Curtiss-Wright Corporation, Wood-Ridge, N.J.

Filed Oct. 14, 1975, Ser. No. 622,124

Int. Cl.² F02B *53/12;* **F02P** *13/00*

U.S. Cl. 123—8.09 **5 Claims**



1. An improved combination of a rotary internal combustion engine, having a housing defining a cavity within which a rotor is supported for rotative movement relative to the housing and defining with the housing a plurality of working chambers which successively expand and contract in volumetric size as the rotor rotates, and a spark plug having a threaded shank portion and a spark gap end portion and an electrical terminal opposite end portion, the improved combination comprising:

a. a bore in said housing extending from the exterior of the housing into communication with the housing cavity;

b. said bore having a threaded portion to receive the threaded shank portion of the spark plug and having a first abutment means extending in a plane substantially normal to the longitudinal axis of the bore;

c. said spark plug having a second abutment means extending in a plane substantially parallel to the plane of said first abutment means and so located as to engage said first abutment means and thereby position the spark gap end portion of the spark plug in a predetermined relationship to the housing cavity;

d. a channel means adjacent said first abutment means to define with the second abutment means a space; and

e. a seal means disposed in said space to engage in fluid tight relationship said second abutment and channel means when the first and second abutment means are engaged and thereby prevent gas leakage through the interstices between the spark plug and the bore.

4,007,715

ROTARY ENGINES, COMPRESSORS AND VACUUM PUMPS

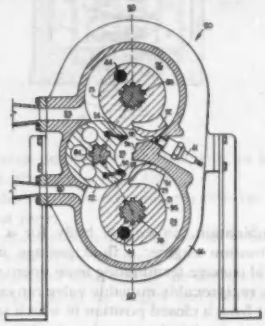
Robert Peter Bonnell, West Beach, and Arthur Douglas Northey, Labrador, both of Australia, assignors to Fairey Norbon Pty. Ltd., Adelaide, Australia

Filed Mar. 24, 1975, Ser. No. 561,555

Claims priority, application Australia, Mar. 28, 1974, 7066/74

Int. Cl.² F02B *53/00*

U.S. Cl. 123—8.43 **12 Claims**



1. A rotary machine having a plurality of rotors rotatable within respective parallel intersecting bores in a stator, at least one of said rotors being a compression rotor and having an axially extending lobe radially outstanding from a rolling surface, which upon rotation sealably co-operates with the curved surface of its respective said bore,

another said rotor being a gas transfer rotor and having a rolling surface in gas-sealing contiguity with the curved surface of its respective bore and containing an axially extending gas transfer recess which extends radially inward from its rolling surface, the gas transfer bore curved surface having an arcuate portion near the intersection of the bores,

drive means coupling the compression rotor to rotate in one direction and the gas transfer rotor to rotate in the opposite direction,

the axes of the rotors being arranged so that, upon rotation, the recess surface is entered by said compression lobe, and when the compression lobe is not within the recess, the rolling surface of the compression rotor lies in gas-sealing contiguity with the rolling surface of the gas transfer rotor,

the compression lobe and the gas transfer recess being of such complementary shape that at a first position during rotation, the compression lobe more than half fills the recess while its trailing portion is still contiguous with its bore, and the leading face of the compression lobe remains in gas-sealing contiguity with the leading surface of the recess, after said rolling surfaces have separated, the circumferential length of said arcuate portion and the recess size being such that the leading portion of the transfer rotor rolling surface is in gas-sealing contiguity with the arcuate portion while at a second position slightly advanced of said first position, no gas-sealing contiguity exists between said lobe trailing portion and the compression rotor bore or the recess surface while said gas-sealing contiguity between the transfer rotor rolling surface and the arcuate portion is maintained, such that any compressed gas contained in said recess

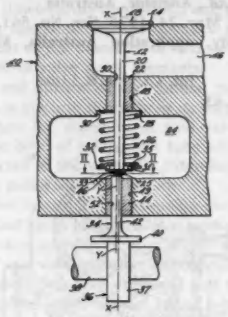
enters the compression rotor bore only past said lobe trailing portion.

4,007,716

OFFSET VALVE LIFTER EFFECTING VALVE ROTATION

Kenneth R. Jones, Thiensville, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Aug. 22, 1975, Ser. No. 606,923
Int. Cl.² F01L *1/32*
U.S. Cl. 123—90.28 **22 Claims**



22. In combination, an engine body for a reciprocating internal combustion engine, a fluid passage in said engine body, said fluid passage terminating in an opening bounded by a valve seat, a reciprocably movable valve movable relative to said valve seat from a closed position in which said opening of said fluid passage is closed to an open position in which said opening of said fluid passage is open, spring means normally biasing said valve to a closed position, said valve comprising a head portion adapted to seat on said valve seat and a stem portion, a first bore in said engine body, said first bore being adapted to guide said valve stem, a second bore in said engine body lying on a common axis with and in axial alignment with said first bore, a guide bushing in said second bore, a valve lifter including a valve lifter stem adapted to engage and move said valve to open position, a rotatable cam mounted on a cam shaft and adapted to engage said valve lifter during the cycle of rotation of said cam whereby to cause said valve lifter to move said valve to open position, the central plane of said cam as measured in the lengthwise dimension of the cam shaft on which said cam is mounted being offset relative to the axis of said valve lifter stem whereby rotation of said cam imparts rotation to said valve lifter, a bore in said guide bushing for receiving and guiding the movement of said valve lifter stem, said bore in said guide bushing being eccentric relative to said common axis, whereby the axis of said valve lifter stem is eccentric relative to the axis of said valve stem, said valve lifter being engageable with said stem portion of said valve during the cycle of rotation of said cam whereby to impart rotation to said valve relative to said valve seat.

4,007,717

GOVERNOR FOR TWO-CYCLE ENGINES

William A. Scott, Cass City, Mich., assignor to Walbro Corporation, Cass City, Mich.

Filed May 23, 1975, Ser. No. 580,425
Int. Cl.² F02D *11/08*
U.S. Cl. 123—103 R **3 Claims**

1. In combination,

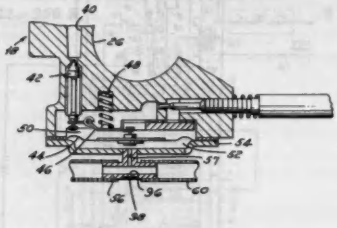
a. an internal combustion engine having a housing and a cooling fan rotor in said housing,

b. a diaphragm carburetor arranged to furnish a fuel and air mixture to said engine having a diaphragm chamber on one side closed by a retaining plate on the dry side of said diaphragm,

c. a connector in said plate leading to the outside,

d. means connecting said connector to the inside of said engine housing to transmit pneumatic pressure developed by said fan rotor in said housing to said diaphragm,

e. said carburetor being mounted adjacent said engine and having a mixing passage and a throttle valve in said mixing passage, and



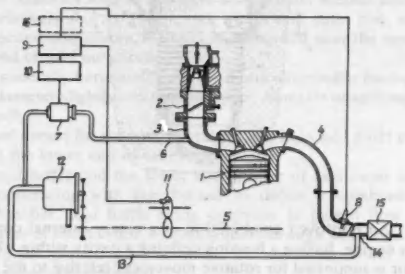
f. means connecting said plate connector to said mixing passage between said throttle and said engine to permit the reduced pressure on said mixing passage created by the closing of the throttle valve to counteract the pressure of said engine fan rotor.

4,007,718

DEVICE FOR CORRECTING THE AIR/PETROL RATIO FOR AN INTERNAL COMBUSTION ENGINE

Bernard R. Laprade; Xavier J. Laprade, both of 64 - Arudy, and Pierre J. Gele, Route de Lourdes, 65 - Odos Tarbes, all of France

Filed July 17, 1973, Ser. No. 380,109
Claims priority, application France, Aug. 2, 1972, 72.27792
Int. Cl.² F02M *25/06;* **F01N** *3/00;* **F02B** *75/10*
U.S. Cl. 123—119 D **7 Claims**



1. A device for correcting the proportioning of the air-petrol mixture furnished by a proportioning member to an internal combustion engine having an intake pipe connected from the proportioning member and an exhaust pipe for burnt gases, the device comprising at least one auxiliary air inlet tapped into said intake pipe downstream of the member determining the proportioning of the air-petrol mixture, means for providing auxiliary air to said at least one auxiliary air inlet at overpressure with respect to the pressure prevailing in the intake pipe, at least one valve controlling the air inlet or inlets, a probe arranged in the exhaust pipe for delivering an electric signal which is a function of the composition of the burnt gases, and electronic means releasing electrical pulses controlling the opening of the valve or valves in synchronism with the engine so as to introduce into the mixture a quantity of air predetermined at each cycle of the engine in response to the information from the probe which the concentration of oxygen in the burnt gases is lower than a predetermined value (or the concentration of CO is higher than a predetermined value).

4,007,719
APPARATUS FOR THE DETOXIFICATION OF EXHAUST GASES

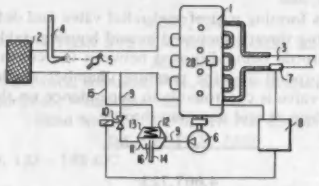
Johannes Brettschneider, Ludwigsburg-Pflugfelden; Lorenz Bundesen, Flensburg, and Heinrich Knapp, Leonberg-Silberberg, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Continuation of Ser. No. 476,231, June 4, 1974, abandoned. This application Dec. 30, 1975, Ser. No. 645,385

Claims priority, application Germany, June 29, 1973, 2333082; Oct. 3, 1973, 2349559

Int. Cl.² F02M 7/00

U.S. Cl. 123—119 D 17 Claims



1. In an apparatus for the detoxification of exhaust gases of an internal combustion engine having (a) a suction tube for air intake to the engine, (b) an air quantity measuring device disposed in said suction tube, (c) fuel metering means for metering out fuel corresponding to the air quantity measured by said air quantity measuring device so as to achieve slightly enriched fuel-air mixture, (d) an exhaust system for the exhaust gases of the engine, and (e) an oxygen sensing means disposed in said exhaust system, the improvement comprising: (f) a secondary pump, (g) means including a secondary air line connected between said secondary air pump and an inlet to said suction tube downstream of said air quantity measuring device, and (h) means connected to and controlled by said oxygen sensing means and connected to said means including said secondary air line for controlling the admission of secondary air from the secondary air pump to the suction tube through said secondary air line, until such time as an optimum value of air number is reached, wherein said means for controlling the admission of secondary air includes:

i. a magnetic valve means disposed within said secondary air line; and

ii. a control device electrically disposed between said magnetic valve means and said oxygen sensing means for amplifying the output voltage of said oxygen sensing means and cyclically controlling said magnetic valve means proportionally to said amplified output voltage, wherein the opening point of said magnetic valve means is cyclically controlled by said control device at a frequency proportional to the engine rpm, in dependence on a signal fed to said control device by an engine rpm measuring means, and wherein the duration of opening of said magnetic valve means is controlled by said control device in dependence on the output voltage of said oxygen sensing means.

4,007,720
FUEL METERING SYSTEM FOR INTERNAL COMBUSTION ENGINES

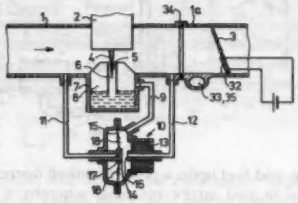
Johannes Brettschneider, Ludwigsburg; Lorenz Bundesen, Flensburg, and Heinrich Knapp, Leonberg-Silberberg, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed July 11, 1975, Ser. No. 595,168

Claims priority, application Germany, July 30, 1974, 2436558

Int. Cl.² F02M 31/00

U.S. Cl. 123—122 R 5 Claims



1. In a fuel metering system, for use with an internal combustion engine, the system including:

A. an air induction tube containing a throttle valve;

B. an exhaust pipe;

C. a fuel container connected by an air conduit with the induction tube of the engine;

D. sensor means, for determining the chemical composition of the exhaust gas of the engine and providing an output signal; and

E. valve means, located in said air conduit, for changing the effective flow cross section thereof and controlled by the output signal from said sensor means; the improvement in the fuel metering system comprising:

F. an electric heating element mounted on at least a portion of the upstream surface of the throttle valve in the induction tube for supplying heat thereto to vaporize fuel droplets condensed on said upstream surface; and

G. heating means located adjacent and upstream of the throttle valve, for heating up a portion of the interior wall of the induction tube in the immediate region of the heating means, said electric heating element and said heating means cooperating to prevent the condensation of fuel on the surface of the throttle valve and on the interior walls of the induction tube region lying immediately upstream of the throttle valve.

4,007,721
FUEL METERING APPARATUS FOR A CARBURETOR

Jose E. Regueiro, Muskegon, Mich., assignor to Teledyne Industries, Inc., Los Angeles, Calif.

Filed May 17, 1974, Ser. No. 471,345

Int. Cl.² F02M 17/22

U.S. Cl. 123—134 7 Claims

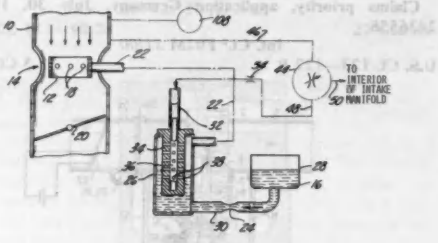
1. In combination: an internal combustion engine having an intake manifold, an air induction pipe, a venturi throat disposed within said air induction pipe, a fuel reservoir, a fuel nozzle means connecting said fuel reservoir and said fuel nozzle means including an emulsifying well disposed intermediate said fuel reservoir and said fuel nozzle means, said fuel nozzle means disposed in said venturi throat for introducing fuel into a stream of air flowing through said air induction pipe,

said emulsifying well including a passage means for directing air into the fuel whereby the fuel delivered to said venturi throat is mixed with air,

means in communication with the interior of said intake manifold for sensing the pressure therein; and

valve means connected intermediate said air induction pipe,

upstream of said fuel nozzle means, and said emulsifying well, said valve means being connected to and responsive to said manifold pressure sensing means to regulate air flow through an outlet to said emulsifying well to decrease the amount of air introduced into said fuel upon a predetermined increase in the pressure in said intake manifold and to increase the amount of air introduced



into said fuel upon a predetermined decrease in the pressure in said intake manifold whereby a predetermined optimum air/fuel mixture is provided for said internal combustion engine over a wide range of engine speeds and loads said valve means comprising a tubular member having apertures therein connecting the interior thereof in the area adjacent said manifold pressure sensing means to said outlet.

4,007,722

FUEL INJECTION SYSTEM

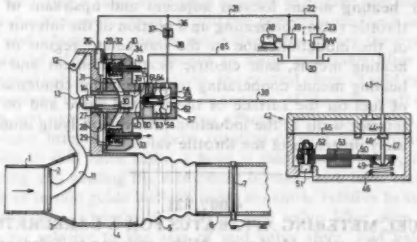
Heinrich Knapp, Leonberg-Silberberg, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Sept. 10, 1975, Ser. No. 611,846

Claims priority, application Germany, Sept. 18, 1974, 2444598

Int. Cl.² F02M 69/00

U.S. Cl. 123—139 AW **5 Claims**



1. In a fuel injection system for externally ignited internal combustion engines including:

a. a suction tube for air intake to the engine;

b. an air sensor disposed in said suction tube;

c. an arbitrarily operable throttle valve disposed in said suction tube in series with said air sensor;

d. a fuel supply conduit;

e. a control pressure conduit;

f. a fuel metering valve connected to said fuel supply conduit and said control pressure conduit for continuously injecting fuel into said suction tube, said fuel metering valve having a pressure chamber defined therein;

g. a control plunger, serving as the movable member of said fuel metering valve, said control plunger being acted upon on one end by said air sensor, and on an opposite end, which extends into said pressure chamber, by a return force provided by liquid under constant but arbitrarily variable pressure delivered by said control pressure conduit, for metering a fuel quantity that is proportionate to the quantity of air flowing through the suction tube and measured by said air sensor; and

h. a pressure control valve connected to the control pressure conduit for varying the pressure in said control pressure conduit in dependence on at least one operating parameter of the engine, said pressure control valve having a temperature-dependent control element disposed therein, the improvement comprising:

i. a relief valve connected to the control pressure conduit and the pressure chamber, said relief valve having a housing connected to the fuel metering valve, in the wall of which there is defined a relief conduit between the control pressure conduit and the pressure chamber, which is effective when a sudden acceleration occurs during the warm-up phase of the engine operation to reduce the pressure in the pressure chamber for a short period of time, and wherein in the course of the above pressure reduction the pressure control valve causes the pressure in the control pressure conduit to be reduced; and

ii. means forming part of said relief valve and defining a damping throttle mounted in said housing, said damping throttle being disposed between the control pressure conduit and the pressure chamber so that said relief valve is controllable in dependence on the pressure drop at said damping throttle.

4,007,723

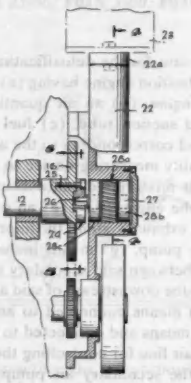
ENGINE FRONT DISTRIBUTOR DRIVE SYSTEM

Kenneth Laughton, 15661 Rosales, Sylmar, Calif. 91342

Filed Nov. 5, 1975, Ser. No. 629,114

Int. Cl.² F02P 7/02

U.S. Cl. 123—148 R **2 Claims**



1. A system for driving the distributor of an engine from the front thereof, comprising:

a drive disc adapted to be concentrically affixed to the front face of the timing gear of said engine, said drive disc having a central, geometrically shaped bore therein,

a cover adapted to be attached to the front of said engine, said cover having an integral mounting platform for said distributor, together with a cylindrical bore extending to said platform,

a drive rod for said distributor journaled within said mounting platform bore,

a gear set mounted within said cover and including one gear member affixed to said drive rod and a cooperating gear mounted for coaxial alignment with said timing gear and drive disc, and

an adaptor shaft coaxially attached to said cooperating gear, said shaft having a correspondingly geometrically shaped projection adapted for mating insertion into said drive

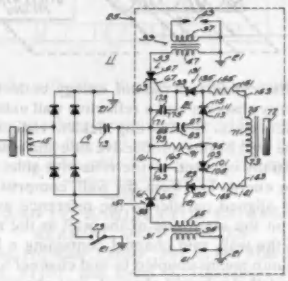
disc bore so that rotation of said timing gear and drive disc will rotationally drive said distributor via said adaptor shaft, said gear set and said distributor drive rod, said shaped projection being axially unattached to said drive disc so as to permit relative axial movement therebetween, whereby said timing disc and distributor will be driven in synchronism regardless of axial displacement or twisting of the engine cam shaft to which said timing gear is attached.

4,007,724

C. D. IGNITION SYSTEM WITH NOISE REJECTION MEANS

Richard J. Mura, Kenosha, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Nov. 21, 1975, Ser. No. 634,072
Int. Cl.² F02P *1/00*
U.S. Cl. 123—148 CC **6 Claims**



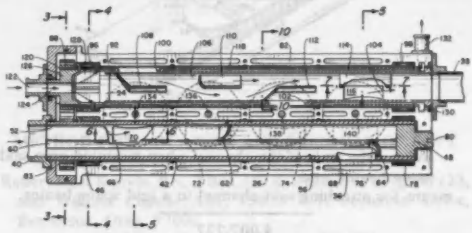
1. An engine ignition system comprising a charge capacitor, means for periodically charging said capacitor, first and second ignition coils respectively including first and second primary windings and first and seciond secondary windings connected respectively to first and second spark plugs, first and second electronic switches respectively including first and second anodes connected respectively to said first and second primary windings, first and second cathodes connected to said charge capacitor, and first and second control elements operable, upon application thereto of a trigger pulse, to cause said first and second switches to be conductive, means including a relatively rotatable magnet and coil for generating trigger pulses in response to engine rotation, said coil having first and second ends respectively connected to said first and second control elements, and means for preventing false triggering of said switches comprising a second capacitor having a first plate connected to said first and second cathodes and having a second plate, a resistor having a first end connected to said first and second cathodes in parallel with the connection of the first plate of said second capacitor to said first and second cathodes, said resistor having a second end, a first diode having an anode connected to said second plate of said second capacitor and to said second end of said resistor and a cathode connected to and between said first end of said coil and said first control element, and a second diode having an anode connected to said second plate of said second capacitor and to said second end of said resistor, and a cathode connected to and between said second end of said coil and said second control element.

4,007,725

ROTARY VALVING UNIT FOR AN INTERNAL COMBUSTION ENGINE

Robert R. Weaver, 1407 Manitou Drive, Santa Barbara, Calif. 93105

Filed Mar. 5, 1975, Ser. No. 555,543
Int. Cl.² F01L *7/00*
U.S. Cl. 123—190 A **7 Claims**



1. In combination with an internal combustion engine, said engine including an engine block, said engine having a plurality of separate spaced apart chambers located within said block, an inlet port and a separate exhaust port formed within said engine block for each said combustion chamber, a piston movably mounted within each said combustion chamber, gases being adapted to ignite and expand within each said combustion chamber causing said piston to be forcibly moved, the improvement comprising:

a valving unit for supplying an ignitable gas mixture through said inlet port and for removing burned gases out through said exhaust port, said valving unit being mounted within a housing, said housing attached to said engine block, an inlet valve rotatably mounted within said housing, an exhaust valve rotatably mounted within said housing, both said inlet valve and said exhaust valve being cylindrical in configuration, said inlet valve having an interior inlet chamber being divided into a plurality of separate chambers with each said separate chamber connecting with a said combustion chamber inlet port through an inlet opening, each said separate chamber terminating just after its respective said inlet opening, said exhaust valve having a single interior exhaust chamber connecting with all said combustion chambers, said exhaust valve having a plurality of exhaust openings with each said exhaust opening connecting with a said exhaust port, both said inlet port and said exhaust port being non-circular in configuration and assuming an irregular shape resembling generally a rectangle to achieve even flow therethrough;

drive means interconnecting said exhaust valve and said inlet valve to rotate such in the same direction at the same rotational velocity, said drive means operates in conjunction with the speed of said engine so that the gases are supplied through said inlet ports at the appropriate instance and the exhaust gases are discharged at the appropriate instance through said exhaust ports.

4,007,726

FORCED AIR ASSEMBLY FOR SPACE HEATER

Thomas F. Kenchel, Huntsville, Ala., assignor to Martin Industries, Inc., Huntsville, Ala.

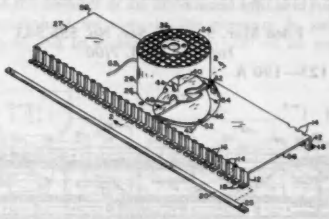
Filed Feb. 11, 1976, Ser. No. 657,069
Int. Cl.² F24H *3/06*
U.S. Cl. 126—67 **6 Claims**

1. A forced air assembly for a space heater comprising:

an elongated channel having open ends, a top region, and spaced serrated side regions, whereby said channel may be selectively deformed to conform, and be attached to, the curved side wall of a space heater;

a cylindrical housing, open at both ends, attached to and extending outwardly normal to said top region of said channel, and forming with an opening in said top region an air passageway through said channel;

a fan mounted in said housing and oriented to blow air into said channel, which air then passes through said channel



and out the ends of the channel when mounted on a said space heater; and

means for attaching said channel to a said space heater.

4,007,727

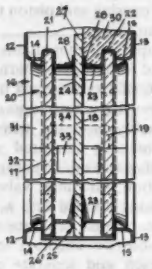
OVEN DOOR WINDOWS

Jacob Krebs, St. Clair Shores, Mich., assignor to Shatterproof Glass Corporation, Detroit, Mich.

Filed Aug. 6, 1975, Ser. No. 602,241

Int. Cl.² F23M 7/04

U.S. Cl. 126—200 **6 Claims**



1. An oven door, comprising a body portion having front and back metal door panels provided with a substantially rectangular opening therein, a window unit mounted in said opening including a substantially rectangular frame formed with spaced channel portions connected by an integral spacer portion, said spacer portion at the top and bottom of the frame being provided with aligned slots, three spaced, parallel glass panels, the inner and outer glass panels being fixedly mounted in said channel portions of the frame and the center glass panel being loosely inserted through the aligned slots in said spacer portion, and means for supporting said center glass panel in said slots.

4,007,728

SOLAR COLLECTOR

Peter Guba, 786 Malibu Lane, Indialantic, Fla. 32903

Filed Jan. 6, 1975, Ser. No. 538,912

Int. Cl.² F24J 3/02

U.S. Cl. 126—271 **11 Claims**

1. Apparatus for collecting heat of radiation comprising:

a hollow member having a panel with a substantially flat exterior surface, said panel capable of absorbing radiation incident to said surface and transferring heat from said radiation to a fluid passing through said member;

a reflector body extending from said surface, said body having an exterior surface for reflecting radiation incident thereto towards said flat surface of said panel;

said reflector body having a hollow interior immediately above the interior of said hollow member; and means directing said fluid into the reflector body wherein

said fluid circulating through said hollow member likewise circulates through the interior of said reflector body.

4,007,729

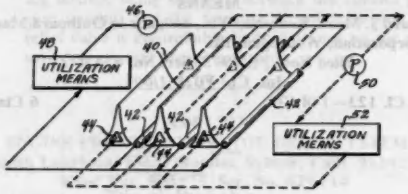
MEANS OF INCREASING EFFICIENCY OF CPC SOLAR ENERGY COLLECTOR

Bei Tse Chao, Urbana, and Ari Rabl, Downers Grove, both of Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed June 27, 1975, Ser. No. 590,980

Int. Cl.² F24J 3/02

U.S. Cl. 126—271 **7 Claims**



1. In a first cylindrical radiant energy collector having a primary energy absorber and a reflective wall extending parallel to a reference axis for directing incident radiation onto said absorber, the wall having a reflective side and a non-reflective side substantially opposed to the reflective side, a device for reducing the energy loss from the wall, comprising:

a channel aligned parallel to the reference axis and positioned on the same side of the wall as the nonreflective side of the wall, said channel containing a heat transfer fluid, pump means coupled to said channel for circulating said fluid through said channel, said channel being such distance from the wall that a portion of the energy incident on and absorbed by the wall is transferred to said fluid, said absorber absorbing energy directed thereto by said wall, said absorber includes a pipe coupled to said pump means, said pump means circulating said fluid through said channel and said pipe, said pipe being so positioned that a portion of the energy directed thereto by said wall is transferred to said fluid in said pipe, said utilization means being coupled to said pipe and thereby utilizing the heat transferred to said fluid in said channel and said pipe heat transferred to said fluid and absorbed by said absorber.

4,007,730

FIREPLACE DAMPER

Fredrick Heebink, 1370 Eighth Ave., Baldwin, Wis. 54002

Filed May 30, 1975, Ser. No. 582,381

Int. Cl.² F23L 11/00

U.S. Cl. 126—286 **3 Claims**

1. A chimney top damper assembly including:

A. a damper plate adopted to cover the top of a chimney flue,

B. a supporting rod attached to the center of said plate normal to the plane thereof,

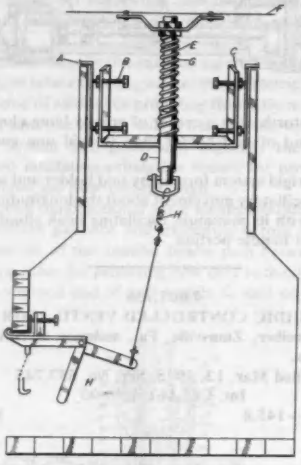
C. said rod being slidably attached to a holding bracket, said bracket being adapted to engage the sides of said chimney flue,

D. spring means engaging said bracket on one end and said

plate on the opposite end positioned to urge said plate upwardly,

E. spring means attached to the lower end of said rod, said spring providing stronger resistance to extensive force than said first spring,

F. cable means attached to said spring and adapted to extend downwardly to the bottom of said chimney,



G. means for attaching the lower end of said cable to a fireplace,

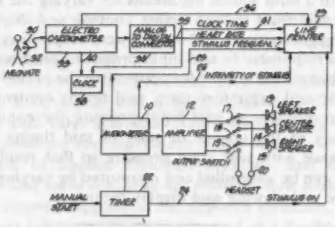
H. said later attaching means being provided with pivotable means for extending said cable to close said damper plate and releasing said cable to open said damper plate.

4,007,731

MEANS AND TECHNIQUES FOR ESTABLISHING HEARING DEFICIENCIES

Ciwa Griffiths, c/o Hear Center, 301 E. Del Mar Blvd., Pasadena, Calif. 91101, and Dean O. Thompson, c/o Two:Dot Enterprises, 4438 Hendrickson Road, Ojai, Calif. 93023

Filed Aug. 14, 1975, Ser. No. 604,898
Int. Cl.² A61B *5/12*
U.S. Cl. 128—2 Z **8 Claims**



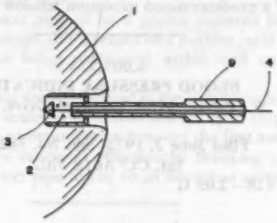
1. In a system for determining hearing capability, means producing a sound stimulus for a subject whose hearing capability is being established; said means being located in sound range of said subject with such sound stimulus being applied to said subject having the capability of producing changes in activity of the heart of said subject; means attached to said subject when said sound stimulus is being so applied to said subject and producing a first signal representative of the heart beat rate of said subject; means producing a second signal representative of the heart beat of said subject; clock means developing a third signal representative of elapsed time; recording means; means applying said first signal, and said third signal to said recording means for producing a recording representative of said heart beat rate and elapsed time and means applying said second signal to said clock means to initiate said third signal.

4,007,732

METHOD FOR LOCATION AND REMOVAL OF SOFT TISSUE IN HUMAN BIOPSY OPERATIONS

Robert Carl Kvavle, Rte. 2 Box 157A, Hillsboro, Oreg. 97123, and William Chester Awe, 15035 NW. Perimeter Drive, Beaverton, Oreg. 97005

Filed Sept. 2, 1975, Ser. No. 609,296
Int. Cl.² A61B *10/00*
U.S. Cl. 128—2 B **2 Claims**



1. A method of location and removal of a biopsy specimen comprising:

locating evidence of early cancer by radiography techniques,

positioning and implanting an x-ray opaque target in the suspect area as the patient is subject to x-ray examination,

extending a locating means from said target outwardly to and through the skin surface,

mounting and guiding a cutting means on said locating means,

rotating said cutting means to cut a biopsy specimen, and cutting and detaching the bottom of said specimen with a knife.

4,007,733

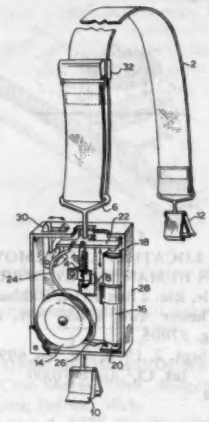
POSTURE TRAINING DEVICE

Victor Celeste; David Charles Drum, and Brian Joseph Nelson, all of Toronto, Canada, assignors to Vaxar Ltd., Toronto, Canada

Filed Feb. 23, 1976, Ser. No. 659,989
Int. Cl.² A61B *5/00*
U.S. Cl. 128—2 S **10 Claims**

1. A posture training device comprising a shoulder strap whose length is adjustable and resiliently extensible, means at each end of the shoulder strap for releasably connecting it to substantially diagonally opposite points on a waistband of

clothing of a user, a device providing a warning signal sensible by the user, and means connected into the strap and to said



signalling device to disable the latter in response to maintenance of a predetermined minimum tension in the strap.

4,007,734

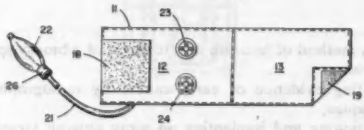
BLOOD PRESSURE INDICATOR

Rudolph W. Peters, 5786 Balmoral Drive, Oakland, Calif. 94619

Filed June 2, 1975, Ser. No. 582,637

Int. Cl.[2] A61B *5/02*

U.S. Cl. 128—2.05 G **9 Claims**



1. A device for indicating blood pressure, comprising a cuff adapted to be secured about a limb, said cuff including an inflatable bladder, means for inflating and deflating said bladder, and at least one pressure sensing switch secured to said cuff; said pressure sensing switch including plunger means resiliently biased to impinge on said bladder, and sound emitting means actuated by said plunger means for signalling a predetermined pressure exerted by said bladder on said plunger means and the limb.

4,007,735

CERVICAL DILATION VIBRATOR

Bengt Uno Gunnar Magnusson, Enkoping, Sweden, assignor to Svedia Dental-Industri AB, Sweden

Filed Aug. 29, 1975, Ser. No. 609,086

Claims priority, application Sweden, Aug. 29, 1974, 7410967

Int. Cl.[2] A61H *1/00*

U.S. Cl. 128—37 **6 Claims**

1. A vibrator for internal use on a human body, especially for dilation of cervical musculature, comprising:

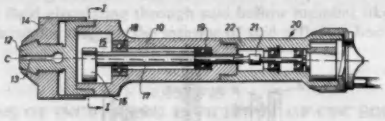
a. a substantially bar-shaped holder having a handle portion for manual holding and guiding of the vibrator;

b. a vibratable solid probe of elongated configuration to extend into the body to be applicable to said musculature and extending in the longitudinal direction of said holder;

c. coupling means rigidly detachably interconnecting one end of said holder and said solid probe;

d. an eccentric vibrator body rotatable about the longitudinal axis of and situated within said holder axially between said handle portion and said coupling means in the immediate vicinity of said coupling means;

e. a motor disposed in the opposite end of said holder and rotatingly coupled to said eccentric body; and



f. the vibrator having a center of gravity lying closer to the motor end of said holder than to said one end of said holder;

whereby the rigid system formed by said holder and said probe is given an oscillatory movement about the longitudinal axis of said holder with its minimum oscillating peak situated in the region of said handle portion.

4,007,736

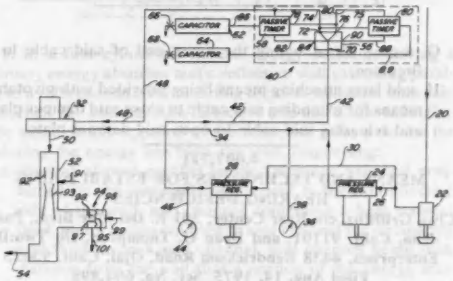
FLUIDIC CONTROLLED VENTILATOR

Peter J. Schreiber, Zionsville, Pa., assignor to N.A.D., Inc., Telford, Pa.

Filed Mar. 12, 1975, Ser. No. 557,745

Int. Cl.[2] A61M *16/00*

U.S. Cl. 128—145.8 **12 Claims**



1. A power unit for a ventilator having a fluid operated timing control, said timing control having input means connected to a fluid source via means for varying the input pressure of said fluid to said timing control, and display means including graduations calibrated to read respiratory frequency which is responsive to said input pressure, said timing control being changeable in state for controlling the period of inspiratory time and expiratory time, said timing control including means responsive to said input pressure for controlling the frequency of the change of state of said timing control in accordance with said input pressure so that respiratory frequency can be controlled and monitored by varying said input pressure and viewing said display means.

4,007,737

ANESTHESIA BREATHING SYSTEM

Bernard R. Paluch, 1607 E. Cedar Lane, Mount Prospect, Ill. 60056

Continuation of Ser. No. 437,033, Jan. 28, 1974, abandoned. This application Apr. 7, 1975, Ser. No. 565,536

Int. Cl.[2] A61M *17/00*

U.S. Cl. 128—188 **10 Claims**

1. An anesthesia breathing system utilized in connection with systems for the administration of inhalation anesthetic agents, including a source of gas for inhalation positioned at one end of the system and patient-supported inhalation-exha-

lation means at the opposed end of the system, the improvement comprising in combination,

a concentrically oriented double tubular inhalation-exhalation tube extending from one end of said system to the opposed end of said system and having one of said tubes positioned interiorly of the other of said tubes, one of said tubes carrying inhaled gas and the other of said tubes carrying exhaled gas,

spacer means for supporting and maintaining said concentrically oriented tubes and spaced in relatively spacial relation,

first unidirectional valve means mounted within said inhalation gas tube extending across the diametric dimension of said one of said tubes providing flow only in the direction from said one end of said system to said opposed end of said system and positioned adjacent the patient-supported inhalation-exhalation means for providing unidirectional gas flow therethrough,

and second unidirectional valve means mounted within said exhalation gas tube and extending across the diametric dimension of the annular fluidic path between said concentric tubes for providing flow only in the direction from said opposed end of said system to said one end of said

system and positioned adjacent the patient-supported inhalation-exhalation means for providing unidirectional gas flow therethrough,

said first and second unidirectional valve means each comprising a valve seat and a flexible membrane seatable against said valve seat, said membrane allowing fluid to flow by flexure and movement of the membrane in one direction of applied fluidized pressure, and seatable against said valve seat thus not allowing flow when fluidized pressure is applied in the opposed direction,

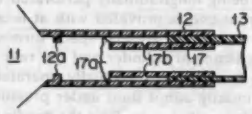
at least said inhalation line being formed of a flexible material rapidly permeable to heat transfer and the gas flow in said exhalation gas tube being countercurrent with respect to the gas flow in said inhalation gas tube, thereby to stabilize and maintain the temperature of the gas within said gas inhalation tube, without any extraneous source of heat, whereby gas suitable for patient inhalation enters said system through said inhalation tube and through said first unidirectional valve means to the patient while exhaled gas flows through said second unidirectional valve means in countercurrent relation with respect to the gas along said gas inhalation tube for exhaustion and/or purification from said system.

4,007,738

MECHANISM FOR ALLOWING BLOOD BAGS TO COMMUNICATE WITH EACH OTHER

Motohiro Yoshino, Fujinomiya, Japan, assignor to Terumo Corporation, Tokyo, Japan

Filed July 1, 1975, Ser. No. 592,171
Claims priority, application Japan, July 31, 1974, 49-91544
Int. Cl.² A61M 5/14
U.S. Cl. 128—214 D **5 Claims**



1. A mechanism for allowing blood bags to communicate with each other, comprising:

a flexible connection pipe having first and second ends, said first end being connected to and communicated with a first blood bag;

a connection tube having a first end connected to and communicated with a second blood bag and a second end which is inserted into, and secured to, the second end of said connection pipe;

a communication pipe of hard plastic material having an open end portion and a sealed end portion, said communication pipe being positioned within said connection pipe; and

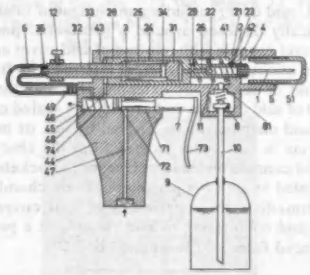
a small thickness section formed in the communication pipe between the sealed end portion and the open end portion, whereby the communication between the first and second blood bags is rendered effective by breaking apart the communication pipe at the small thickness section.

4,007,739

FLUID-OPERATED HYPODERMIC SYRINGE

Dan Bron, 36 Palmah St. Romema, Haifa, and Amatzia Arazi, Doar Nah, Medigo, both of Israel

Filed July 18, 1975, Ser. No. 596,975
Claims priority, application Israel, Aug. 2, 1974, 45391
Int. Cl.² A61M 5/00
U.S. Cl. 128—218 R **7 Claims**



1. A hypodermic syringe for operation by a fluid under pressure which comprises (a) an outer casing having a longitudinal cylindrical hollow space provided with a first port at its "front" or "needle" end for drawing a medicament from a container through a duct and a check-valve, and a second port at its rear end for admitting or releasing pressurized fluid, (b) a front differential piston unit, the large-diameter, rear portion of which is slidingly arranged in the hollow space of the casing, while the small-diameter, front portion protrudes out of the casing through an opening in its front cover and carries an injection needle in its foremost part, the large-diameter portion being furthermore hollow in the shape of a cylinder which

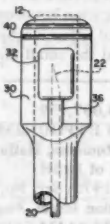
is firstly connected to the needle by a duct containing a check valve, and secondly by at least one opening to a front annular space formed between the casing and the small-diameter portion, (c) pressure means adapted to bias the front differential piston unit to the rear of the casing, (d) a rear differential piston unit having its front portion of larger diameter slidingly arranged in the medicament cylinder of the front differential piston unit, while its rear, longitudinal portion of a smaller diameter penetrates through the rear cover of the medicament cylinder and through the rear of the casing into the open, the latter portion being longitudinally perforated by a fluid duct which at its front end is provided with at least one opening connecting it to the rear annular space formed between the wall of the medicament cylinder and the rear portion of the rear differential piston, (e) manually operated valve means adapted to primarily admit fluid under pressure to the front differential piston unit so as to drive the needle forward and to transfer medicament from the front annular space to the medicament cylinder through the openings provided between these spaces and, upon further actuation of the valve, to admit pressurized fluid to the rear annular space so as to drive the rear differential piston unit in forward direction and to eject the medicament through the needle.

4,007,740

CANNULA COVER

Robert A. Owen, Mount Prospect, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Feb. 11, 1976, Ser. No. 657,000
Int. Cl.² A61M *5/00*
U.S. Cl. 128—221 **17 Claims**



1. A cover for an elongated cannula having a sharpened distal end, said cover including an elongated tubular member concentrically disposed around a substantial portion of the length of said cannula with one end of said cover engaging said cannula in encircling arrangement intermediate its length, the second end of said cover extending beyond the sharpened distal end of said cannula and providing a sealed chamber, the walls of said chamber being formed by one or more bubble-like pockets in said cover spaced from the sharpened distal end of said cannula and said one or more pockets being completely sealed around the periphery of said chamber with one wall, intermediate the extremities of said cover, intimately engaging and conforming to said cannula at a point adjacent to but spaced from said sharpened tip.

4,007,741

TRANSURETHRAL RESECTION APRON SYSTEM

Rayburn C. Waldrop, Rte. 3, Box 280, Manor Road, Clinton, Tenn. 37716, and Richard G. Brantley, Sparks Road, Knoxville, Tenn. 37921

Filed Apr. 11, 1975, Ser. No. 567,428
Int. Cl.² A61F *13/16*
U.S. Cl. 128—292 **4 Claims**

1. Apparatus for capturing fluids and resected material purged from the bladder of a patient on a urological table during a transurethral resection performed by a surgeon and for separating resected particles entrained in said fluids comprising

flexible apron means defining a fluid capture region adjacent one end of said urological table, said apron means including a forward end and a rear end,

connecting means adapted for releasably connecting said forward end of said apron to one end of said urological table adjacent to said patient,

connecting means adapted for positively and releasably connecting said rear end of said apron to the neck region of said surgeon,

said apron means being unsupported by external means in the region between its forward end and its rear end and comprising a plurality of flexible pentagonal panels, each of which includes a top edge, a front edge joined to one end of said top edge and forming an obtuse angle therewith, a rear edge joined to the other end of said top edge

and forming an obtuse angle therewith, a bottom forward side, and a bottom rear side, said bottom forward and said bottom rear sides being joined to respective ones of said front and bottom rear edges except at the junction of said edges whereby when said apron is pulled taut by reason of a force applied to its opposite ends, said apron opens to form an upwardly opening capture region,

receptacle means releasably connected with said apron means and in fluid communication therewith,

strainer means removably held in said receptacle means for collecting said resected material entrained in said fluid passing to said receptacle means, and

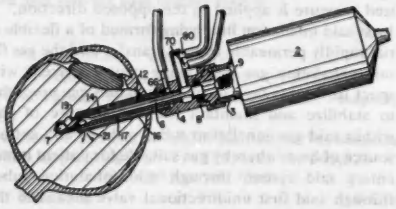
hose means in fluid communication with said receptacle means for conducting fluids from said receptacle to a remote depository.

4,007,742

SURGICAL SYSTEM FOR CONTROLLING THE INFUSION OF FLUID TO AND THE EVACUATION OF FLUID AND MATERIAL FROM AN OPERATING FIELD

Anton Banko, Bronx, N.Y., assignor to Surgical Design Corporation., Long Island City, N.Y.

Continuation-in-part of Ser. No. 475,398, June 3, 1974, Pat. No. 3,920,014. This application Nov. 17, 1975, Ser. No. 632,767
Int. Cl.² A61M *1/00*
U.S. Cl. 128—230 **8 Claims**



1. In combination, a system for use with a surgical instrument of the type having an operative portion at an operating site with the operative portion including a first means for

delivering an infusion fluid to the operating site and a second means for removing material from the operating site,

a source of infusion fluid,

means for supplying infusion fluid from said source to said first means of said instrument,

means producing a pressure differential condition at said second means of the instrument with respect to the pressure of the infusion fluid at said first means to provide removal of material from the operating site,

means including first control means for selectively providing infusion fluid to said second means of said instrument,

and means for selectively operating said pressure differential producing means and said first control means in first and second conditions wherein in the first condition material is removed by said second means of the instrument and infusion fluid is blocked from said second means by said first control means, and in a second condition wherein said removal of material by said second means is blocked and operates said first control means to supply infusion fluid to said second means of the instrument at the same time said first means is receiving infusion fluid.

4,007,743

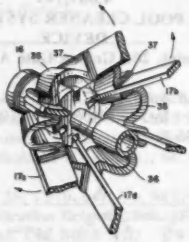
OPENING MECHANISM FOR UMBRELLA-LIKE INTRAVASCULAR SHUNT DEFECT CLOSURE DEVICE

Larry W. Blake, Costa Mesa, Calif., assignor to American Hospital Supply Corporation, Evanston, Ill.

Filed Oct. 20, 1975, Ser. No. 623,788

Int. Cl.² A61B *17/04*

U.S. Cl. 128—334 R **14 Claims**



1. In an umbrella-like expansive device for closing intravascular shunt defects and the like, said device having a central hub, a plurality of struts movably mounted on the hub and movable between a first, collapsed position in which the struts extend generally parallel to the axis of the hub and a second, expanded position in which the struts extend generally radially from the hub, and closure material extending between the struts and secured thereto, an improved expansion means for moving the struts from the first position to the second position comprising a foldable, resilient strip extending between each pair of adjacent struts and secured thereto, each strip being folded between the struts when the struts are in the first position, whereby the folded resilient strips bias the struts from the first position toward the second position.

4,007,744

GRAIN ACCELERATOR PRECLEANER

J. Lyle Shaver, Blue Springs, Mo., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed July 2, 1975, Ser. No. 592,713

Int. Cl.² A01F *12/24*

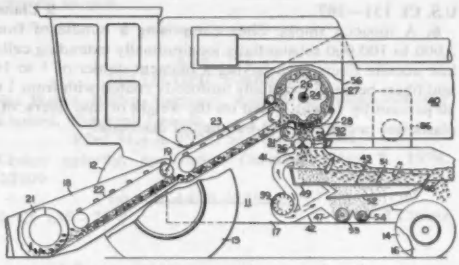
U.S. Cl. 130—27 Q **9 Claims**

1. In a grain harvester having a threshing cylinder, and a concave on the underside of said cylinder, the combination comprising:

a shaker shoe assembly including a grain pan at its forward end disposed beneath said concave,

a pair of side by side accelerator rolls disposed above said grain pan and in underlying relation to said concave, said accelerator rolls being disposed on horizontally spaced parallel axes and receiving therebetween threshed material from said concave,

power means driving said accelerator rolls in opposite directions whereby threshed material passing between said



rolls is accelerated downwardly toward said grain pan, and

air delivery means directing a predetermined horizontal rearward flow of air through and transverse to the accelerated threshed material passing from said accelerator rolls to blow the chaff and straw particles rearwardly from the kernels of grain which pass downwardly to the grain pan.

4,007,745

FILTER

John Courtright Randall, and Charles Herbert Keith, both of Charlotte, N.C., assignors to Celanese Corporation, New York, N.Y.

Continuation of Ser. No. 127,386, March 23, 1971, abandoned. This application Mar. 12, 1974, Ser. No. 450,530

Int. Cl.² A24D *1/06*

U.S. Cl. 131—261 R **2 Claims**

1. A cigarette filter comprising a gathered web of substantially longitudinally aligned continuous, crimped, opened cellulose acetate filaments, said web having a series of longitudinally extending substantially rectangular grooves along the surface thereof said grooves forming a multitude of triangular shaped channels for smoke.

4,007,746
METHOD FOR PREPARING CELLULOSE ACETATE FIBER RODS

Hideo Sawada, Osaka, and Motoharu Kotani, Sakai, both of Japan, assignors to Daicel, Ltd., Osaka, Japan

Filed June 2, 1975, Ser. No. 582,635
Claims priority, application Japan, June 21, 1974, 49-71062
Int. Cl.² A24C 5/50
U.S. Cl. 131—267 9 Claims

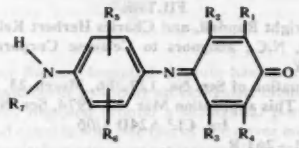
6. A tobacco smoke filter comprising a bundle of from 3,000 to 100,000 substantially longitudinally extending cellulose acetate fibers each having a filament denier of 1 to 16, said fibers being substantially uniformly coated with from 1 to 20 percent by weight, based on the weight of said fibers, of a plasticizer comprising 1,4-butanediol diacetate.

4,007,747
N-MONOSUBSTITUTED INDOANILINES AS DYESTUFFS FOR KERATINIC FIBERS

Grégoire Kalopissis, Neuilly-sur-Seine; Andrée Bugaut, Boulogne-sur-Seine, and Francoise Estradier, Paris, all of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

Filed Dec. 9, 1974, Ser. No. 530,975
Claims priority, application Luxembourg, Dec. 12, 1973, 68988
Int. Cl.² A61K 7/13; A45D 7/02
U.S. Cl. 132—7 16 Claims

1. A composition for dyeing keratin fibers which comprises a dyeing effective amount of an indoaniline compound of the formula



or a tautomeric form thereof wherein R_1 and R_4 each independently represent a member selected from the group consisting of hydrogen, halogen, alkyl having 1 to 6 carbon atoms, alkoxy having 1 to 6 carbon atoms, acetylamino and ureido,

R_2 and R_3 each independently represent a member selected from the group consisting of hydrogen, halogen, alkyl having 1 to 6 carbon atoms, alkoxy having 1 to 6 carbon atoms, amino, N-alkylamino, N-(hydroxyalkyl)-amino, N-(carbamylalkyl)-amino, acetylamino and ureido, each of said alkyl moieties containing 1 to 6 carbon atoms,

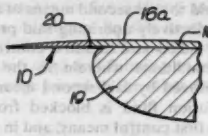
R_5 and R_6 each independently represent a member selected from the group consisting of hydrogen, halogen, alkyl having 1 to 6 carbon atoms and alkoxy having 1 to 6 carbon atoms with the proviso that when R_5 and R_6 are both other than hydrogen at least one is in a meta-position relative to the NHR_7; and

R_7 represents a member selected from the group consisting of alkyl, hydroxyalkyl, acetylaminoalkyl, mesylaminoalkyl, carbamylalkyl, aminoalkyl and morpholinoalkyl, each of said alkyl moieties containing 1 to 6 carbon atoms and a compatible vehicle.

4,007,748
FINGERNAIL EXTENSION

Eve Matranga, West Los Angeles, and Yosh Hokama, Torrance, both of Calif., assignors to Eve-N-Tips Industries, Gardena, Calif.

Continuation of Ser. No. 557,765, March 12, 1975, abandoned. This application Feb. 13, 1976, Ser. No. 657,767
Int. Cl.² A45D 29/00
U.S. Cl. 132—73 1 Claim



1. In combination with a natural fingernail, a solid artificial fingernail attached to said natural fingernail having a forwardmost generally convex peripheral edge, said artificial fingernail comprising

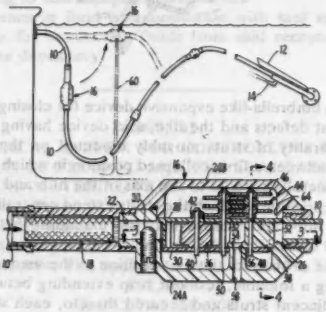
a. a thin plastic sheet element sized to provide a forward extension of the natural fingernail,

b. said element having a generally concave rearward-most peripheral edge peripherally abutting in edge-to-edge relation the major extent of said convex forward-most edge of the natural fingernail and adhesively bonded thereto only at said edges, the element rearward-most edge contacting the fingernail only at said forward-most edge thereof.

4,007,749
AUTOMATIC POOL CLEANER SYSTEM WITH TIMER DEVICE

Andrew L. Pansini, 200 Golden Gate Ave., Belvedere, Calif. 94920

Filed Apr. 7, 1975, Ser. No. 565,805
Int. Cl.² B08B 3/02, 9/00
U.S. Cl. 134—56 R 5 Claims



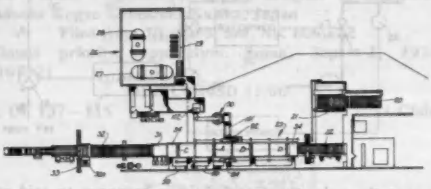
1. In combination with a swimming pool cleaner comprising a transporter, movable about a pool under the influence of jet drive means, and a water supply hose, provided with a poolside connected end and a free end, having its free end connected to said jet drive means to supply water thereto and to, in turn, be towed thereby: a control device connected to said supply hose operable to control said transporter by controlling the flow of water through said hose to said jet drive means, said device comprising a housing having an inlet and an outlet conduit, first means associated with said housing between said conduits operable to automatically control the flow of water to said jet drive means by alternatingly shutting off and turning on the flow of water to said jet drive means, and second means associated with said housing between said conduits and driven by water flowing in said housing to operate said first means.

4,007,750

CONTINUOUS SHEET PICKLING APPARATUS

John W. Galloway, South Point, Ohio, assignor to Armco Steel Corporation, Middletown, Ohio

Filed July 14, 1975, Ser. No. 595,690
Int. Cl.² B08B 3/04
U.S. Cl. 134—83 16 Claims



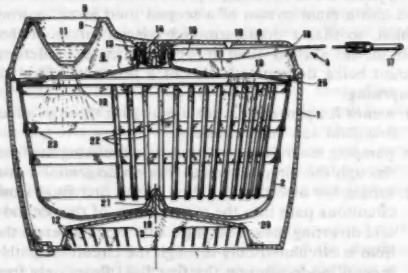
1. A continuous sheet pickling line and apparatus therefor which comprises: a pickling tank adapted to contain a bath of pickling acid, said tank being comprised of an acid resisting, steel supported material having expansion characteristics differing from that of the steel; a plurality of horizontally disposed, parallel roll shafts disposed in said tank; a plurality of sheet bearing donuts mounted on each of said shafts; means to drive at least some of said shafts; the said means to drive said shafts including submerged shaft bearings and a gear train located within said tank; a drive shaft extending over said tank to said gear train; power means located outside of said tank and connected to said drive shaft; means to maintain a level of bath acid which is above that of the sheets passing therethrough on said donuts; and means to introduce sheets into said tank and onto said donuts.

4,007,751

APPARATUS FOR WASHING VEGETABLES, FRUITS AND THE LIKE FOODSTUFFS

Michel Commiant, Brussels, Belgium, assignor to Compagnie Generale Belge des Isolants (COGEBI), St. Gilles-lez-Brussels, Belgium

Filed Feb. 25, 1976, Ser. No. 661,415
Claims priority, application Belgium, Feb. 25, 1976, 825939
Int. Cl.² B08B 3/02
U.S. Cl. 134—140 7 Claims



1. Apparatus for washing vegetables, fruits and the like foodstuffs, comprising: a vessel having a central vertical axis; a basket, within said vessel, for containing said foodstuffs; means in said vessel and on said basket for mounting said basket in said vessel for rotation about said vertical axis; means driving said basket into rotation in said vessel, and means to distribute and spray water over said foodstuffs as said basket is rotated; said driving means comprising a cover fixed over said vessel; a disc as a removable part of said basket and means mounting said disc on said cover for rotation relative to said cover and about said vertical axis; means removably fastening said disc to said basket along the respective peripheries thereof and means, operable from outside said vessel, to rotate said disc and basket; wherein an apertured chamber is provided on said cover and at least one hole is formed through said disc and positioned to register with the aperture of said chamber during rotation of said basket whereby water poured into said apertured chamber during rotation of said basket flows through said hole and washes said foodstuffs therein.

4,007,752

TELESCOPIC UMBRELLA

Heinz Weber, Hilden, Germany, assignor to Telesco Brophey Limited, Montreal, Canada

Filed May 8, 1975, Ser. No. 575,748
Claims priority, application Germany, May 8, 1974, 2422209
Int. Cl.² A45B 19/04, 19/10
U.S. Cl. 135—25 R 2 Claims

1. A collapsible umbrella having an umbrella stick, a crown at the end of the stick, a runner slidably mounted on the stick, stretcher members, each pivotally mounted at one end thereof to said runner, dome ribs pivotally connected to each stretcher member at free ends thereof, and each dome rib extending in a direction away from the crown, strut members, each hinged at one end to a support member on the stick at the other ends, each to a respective one stretcher member at a hinge point intermediate the ends of said stretcher member, each dome rib including an inner section and an outer section hinged to the outer end of the inner section, said inner section being spaced from said crown, said stretcher member being connected to the inner section thereof, a first control link member hinged to the strut at a point intermediate the ends of the strut member, said first control link hinged to an extension of the inner section of the dome rib inwardly of the hinge point with the stretcher member forming a parallelogram linkage with the stretcher member, the first control link member, the extension of the inner dome rib section and the portion of the strut member between the stretcher and the first control link; a second control link means hinged at one end to the stretcher member between the ends thereof and at the other end to an extension of the outer dome rib section extending inwardly of the hinge point with the inner dome rib section, whereby as the runner is moved on the stick to open and close the frame, the first and second control link means act in tension and compression respectively to urge the outer section to pivot about said hinge point at the outer end of the inner dome rib section.

4,007,753

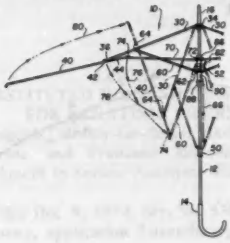
FOLDING UMBRELLA

Joseph H. DeMarco, 60 Seaman Ave., New York, N.Y. 10034

Filed Jan. 22, 1976, Ser. No. 651,475
Int. Cl.² A45B 19/10
U.S. Cl. 135—25 R 2 Claims

1. An improved folding umbrella comprising a rod having at opposite ends a handle and an operative distal end and defining a path of movement therealong between said handle and

distal end, a folding and unfolding cover for said umbrella, a first set of plural circumferentially spaced umbrella cover-supporting ribs each operatively pivotally mounted at one end adjacent said distal end of said rod and presenting opposite operative ends, a second set of similarly circumferentially spaced plural umbrella cover-supporting ribs cooperating with said first set by serving as a radial extension thereof which are each at locations spaced from one end to provide a fulcrum pivotally attached to a cooperating operative end of one said rib of said first set, upper and lower slide members disposed on said rod for sliding movement therealong, a first set of plural braces pivotally connected in spanning relation in the plane of said first and second sets of ribs between a cooperating rib of said first set of ribs and said lower slide member so as to partake of pivotal umbrella opening and closing movements in response to ascending and descending sliding movements respectively of said lower slide member, a second set of plural



braces each pivotally connected substantially in said same plane as said first set of braces in spanning relation between said fulcrum end of a cooperating rib of said second set of ribs and said upper slide member so that during initial descending sliding movement of said lower sliding member preparatory to umbrella closing movement of said first and second sets of ribs there is caused a corresponding initial sliding movement in said upper sliding member effective to initiate clockwise pivotal movement in said fulcrum ends of said second set of ribs, each brace from said first set having a criss-crossing relation with a brace from said second set in said open condition of said umbrella, and at each said location where said cooperating braces criss-cross one said brace has a slot formed therein and said other brace has an operative position projected through said slot, whereby in response to continued descending sliding movement of said lower sliding member said first and second sets of ribs close upon each other as well as upon said umbrella rod.

4,007,754

FLOW CONTROL SYSTEM

Maurice Sidney Beck, Ilkley, and Robert Malcolm Henry, Sowerby Bridge, both of England, assignors to National Research Development Corporation, London, England

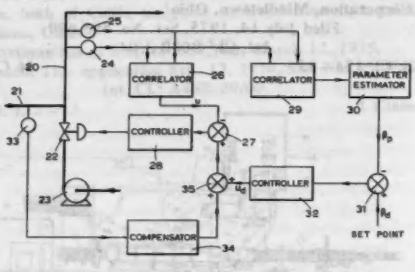
Filed Apr. 2, 1975, Ser. No. 564,653

Claims priority, application United Kingdom, Apr. 9, 1974, 15764/74

Int. Cl.² G01F *1/00*

U.S. Cl. 137—2 **11 Claims**

1. A process for controlling the flow of particles conveyed by means of a flowing fluid comprising obtaining first and second electrical signals by sensing the passage of naturally occurring random disturbances in the flow of particles respectively past first and second points separated by a known distance along a path for the flow of particles, producing a cross-correlation function of said first and second electrical signals over a predetermined integration time deriving from the correlation function a third electrical signal which is a function of the spread of particle velocities in the particle velocity spectrum in the system, providing a fourth electrical signal which is a function of the desired spread of particle velocities, comparing the third and fourth signals to derive an error signal and



varying the velocity of said fluid in response to said error signal.

4,007,755

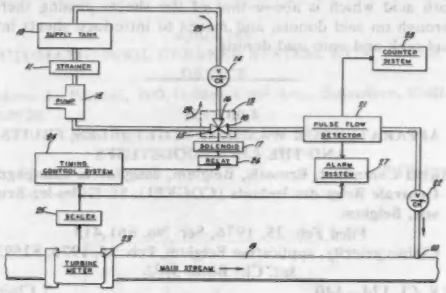
COMPONENT INJECTION SYSTEM

Julius Lerner, Broomall, and Robert Mayer, Ardmore, both of Pa., assignors to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Continuation-in-part of Ser. No. 434,535, Jan. 18, 1974, abandoned. This application Mar. 6, 1975, Ser. No. 556,026

Int. Cl.² G05D *11/13*

U.S. Cl. 137—101.21 **12 Claims**



1. System for introducing a predetermined amount of a first fluid into a main stream of a second fluid in an intermittent fashion, so that a predetermined concentration of the first fluid in the second fluid is obtained, said predetermined amount being determined without a flowmeter, said system comprising:

a. means for providing a circuitous path through which the first fluid can be circulated;

b. pumping means for continuously circulating the first fluid through the circuitous path at a predetermined rate;

c. means for diverting the flow of the first fluid from said circuitous path into the main stream of the second fluid, said diverting means having a first mode wherein the first fluid is circulated only through the circuitous path and a second mode wherein the first fluid flows only from the circuitous path into the main stream;

d. means for measuring the flow rate of the main stream of the second fluid and producing signals related to the flow rate; and

e. means, responsive to the signals produced by the measuring means, for maintaining a predetermined concentration of the first fluid in the second fluid, by controlling the diverting means so that it is moved from its first mode to its second mode, and back to its first mode after a predetermined length of time has elapsed, thereby permitting a predetermined amount of the first fluid to be introduced into the main stream of the second fluid after a predeter-

mined amount of the second fluid has flowed through the measuring means.

4,007,756

AIR CONTROL APPARATUS FOR AN ENGINE EXHAUST GAS PURIFICATION SYSTEM

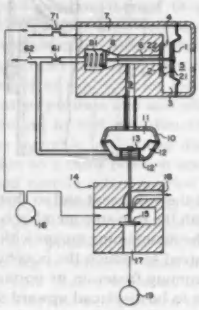
Hideo Umino, Nagaokakyo, Japan, assignor to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Aug. 20, 1975, Ser. No. 606,122

Claims priority, application Japan, Sept. 2, 1974, 49-101121

Int. Cl.² G05D *11/00*

U.S. Cl. 137—115 **1 Claim**



1. Air control apparatus for an engine exhaust gas purifier, comprising:

air supply means for supplying air at super-atmospheric pressure for selective application of the air to an exhaust gas purifier of an engine;

an air control valve for operation to selectively connect air, supplied by the supply means, to the purifier and to the atmosphere, for said selective application of the air;

a differential-pressure responsive device for operating the valve, the device having a casing, a movable member dividing the casing into first and second compartments, means for applying to the first compartment a suction of an intake manifold of the engine, means defining a connector passage for applying a control pressure to the second compartment and for thereby providing a pressure differential acting on the movable member, and means connecting the movable member to the air control valve for moving the valve by the member in response to the differential;

a differential-pressure responsive unit for controlling the differential-pressure responsive device, the unit having a housing and having, disposed therein, a diaphragm member dividing the housing into a first portion and a second portion, and means for applying a constant pressure to the first portion and to a first side of the diaphragm member therein;

means for applying variable pressures to the second portion of the housing and to a second side of the diaphragm member therein, comprising (a) a fixed partition in the housing, having a valve seat thereon and disposed in the second portion of the housing to divide the second portion into a pressure chamber surrounding the valve seat and a suction chamber surrounded by the valve seat if the diaphragm member contacts the valve seat, the diaphragm member being enabled by predetermined differentials between the constant and variable pressures selectively to effect the contacting of the valve seat and to move to positions remote from the valve seat, (b) a pressure passage in the housing for applying air at super-atmospheric pressure, supplied by the air supply means, to the second portion of the housing, outside of the valve seat, (c) a suction passage in the housing for applying the suction of the intake manifold to the second portion of the housing, inside of the valve seat, and (d) a suction shut-off valve in the housing, connected to the diaphragm member and disposed in the suction passage to open that passage if the diaphragm member contacts the valve seat, and progressively to close the passage if the diaphragm member progressively moves to positions remote from the valve seat; and

means establishing communication of the suction passage in the housing with the connector passage to the second compartment of the casing of the differential-pressure responsive device to provide the control pressure acting on the movable member in that device for moving the air control valve;

whereby the selective connecting of air to the purifier can be performed by the air control valve while the suction of the intake manifold varies, and also while the suction remains uniform.

4,007,757

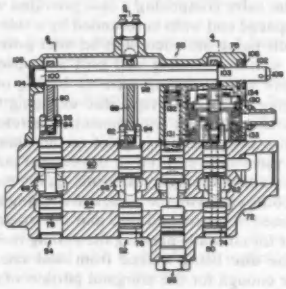
VALVE SHIFTING MECHANISM

Robert Wayne Emmert, Cedar Falls, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Oct. 16, 1975, Ser. No. 623,086

Int. Cl.² F16K *31/524*

U.S. Cl. 137—315 **3 Claims**



1. In a valve having a plurality of passages therein and first and second spool means therein selectively shiftable to connect and disconnect the passages, a spool means shifting mechanism comprising: a control shaft having a portion of hexagonal cross-section rotatably mounted in the valve proximate one end of the first and second spool means and having means therein for orienting the shaft relative to the valve; first cam means having a first hexagonal hole provided therein for nonrotatably and slidably mounting the first cam means on the shaft and further having indicia means therein for orienting the first hole relative to the orienting means in the shaft, the first cam means including first cam surface means therein positioned in a predetermined relationship to the first hole; the first cam surface having a first predetermined working profile with displacement towards and away from the first hole; second cam means having a second hexagonal hole provided therein for nonrotatably and slidably mounting the second cam means on the shaft and further having indicia means therein for orienting the second hole relative to the orienting means in the shaft; the second cam means including second cam surface means therein positioned in a predetermined relationship to the second hole; the second cam surface means having a second predetermined working profile with displacement towards and away from the second hole; first and second cam follower means connected respectively to the one ends of the first and second spool means and operatively associated with the first and second cam means, respectively, to limit sliding thereof on the shaft, said first and second cam

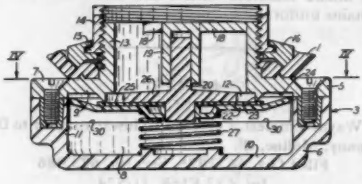
follower means respectively following the first and second cam surface means when the first and second cam means are rotated by the control shaft whereby rotation of the shaft will shift the first and second spool means in a predetermined sequence.

4,007,758

RESPIRATOR PRESSURE-DEMAND EXHALATION VALVE

Robert E. Gray, Pittsburgh, and Leslie F. Boord, Elizabeth, both of Pa., assignors to Mine Safety Appliances Company, Pittsburgh, Pa.

Filed Jan. 14, 1976, Ser. No. 648,915
Int. Cl.² F16K *17/20*
U.S. Cl. 137—472 **8 Claims**



1. A pressure-demand exhalation valve for a respirator facepiece, the valve comprising a case provided with a chamber having spaced end walls surrounded by a side wall, one of said end walls being provided with an inlet port for exhaled air, a valve seat surrounding said port and spaced inwardly from said side wall, a sealing member having one side normally engaging said seat, a rigid disc engaging the opposite side of the sealing member and connected thereto, the diameter of the disc being nearly as great as the diameter of said chamber, a valve stem secured to the central portion of said disc and extending through said port, guide means for the valve stem connected with the case, and a spring in said chamber compressed between said disc and the other end wall of the chamber for normally pressing the sealing member against said seat, the disc being spaced from said one wall of the chamber far enough for the marginal portion of the disc that extends laterally out beyond the valve seat to be inclined toward said one wall but spaced therefrom, the side wall of said chamber being provided with a plurality of exhaust slots extending around said disc and having inner walls adjacent said one wall of the case lying in a plane substantially coinciding with the plane in which lies the edge of the disc that is closest to said one wall of the case, and the space between said valve seat and the side wall of the case always being open to said slots.

4,007,759

PRESSURE STABILIZER FOR HYDROCARBON STORAGE FACILITIES

William R. Martin, Willow Grove, and Stewart W. Nystrom, Malvern, both of Pa., assignors to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

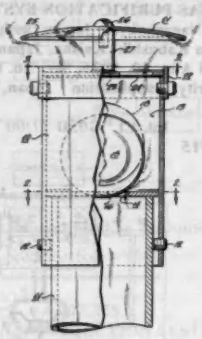
Filed Sept. 15, 1975, Ser. No. 613,141
Int. Cl.² F16K *15/04*
U.S. Cl. 137—550 **5 Claims**

1. A pressure stabilizer system for use on a vent line from a hydrocarbon storage facility, said stabilizer designed to maintain an orifice open to the atmosphere, to release any pressure above a predetermined amount, and to minimize the effect of weather conditions on its operation, and comprising:

a. a stabilizer housing, having means for connection to the vent line and a valve seat;

b. a movable valve member having a given weight to provide said member with a specific gravity greater than one, so that a predetermined amount of pressure applied under the movable member will displace it upward from its normal position; and

c. a plurality of support members spaced from each other for maintaining the movable valve member away from the valve seat in its normal position so that an orifice having a predetermined area is formed between the movable



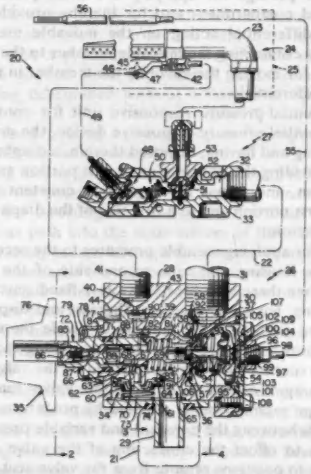
member and the valve seat and so that the contact by the valve seat with the movable member is eliminated and the contact by the maintaining means with the movable member is minimized to reduce the possibility of the movable member becoming frozen in its normal position, thereby being unable to be displaced upward if the pressure to be relieved reaches the predetermined amount.

4,007,760

FUEL CONTROL SYSTEM AND CONTROL DEVICE THEREFOR OR THE LIKE

Charles D. Branson, and Roy C. Demi, both of Greensburg, Pa., assignors to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 530,605, Dec. 9, 1974, Published Application No. B530,605, and a continuation-in-part of Ser. No. 443,783, Feb. 19, 1974, abandoned, which is a continuation-in-part of Ser. No. 380,389, July 18, 1973, abandoned. This application Aug. 15, 1975, Ser. No. 604,928
Int. Cl.² F23N *1/00*
U.S. Cl. 137—614.13 **18 Claims**



1. In a fuel control system for a fuel burning apparatus or the like having a source of fuel adapted to be interconnected by passage defining means to main burner means of said appa-

ratus, a fuel control device disposed in said passage defining means and having poppet valve means that is directly manually operated for opening and closing said passage defining means so as to control the flow of fuel from said source to said main burner means, said control device having a selector means operatively interconnected to said poppet valve means to operate the same, said control device having throttle valve means downstream from said poppet valve means for throttling fuel flow through said passage defining means to said burner means, said selector means also being operatively interconnected to said throttle valve means to operate the same, the improvement wherein said selector means of said control device is provided with a cam means, said poppet valve means of said control device being operatively associated with said cam means of said selector means to be moved from a closed position thereof to an open position thereof as said selector means is moved between an off position thereof and a certain other position thereof in one direction and to be moved from said open position thereof to said closed position thereof as said selector means is moved between said certain other position and said off position thereof in an opposite direction to said one direction, said selector means being further movable in said one direction from said certain other position to a third position and from said third position back to said certain other position in said opposite direction, said selector means operating only said throttle valve means during its movement between said certain other position and said third position, said selector means being rotatable and including a rotatable shaft means, said shaft means having said cam means thereon, said poppet valve means of said control device being moved transversely to the axis of rotation of said shaft means by said cam means as said shaft means is being rotated to open or close said poppet valve means of said control device, said throttle valve means being axially movable and being threadedly interconnected to said shaft means to be axially moved thereby as said shaft means is rotated and thereby changing its threaded relation with said throttle valve means.

4,007,761

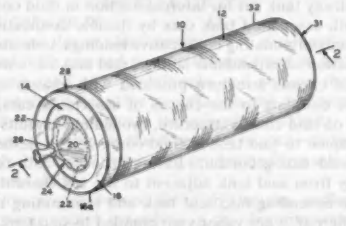
PREPACKAGED SHIRRED TUBULAR CASING ARTICLE

John Heller Beckman, La Grange Park, Ill., assignor to Union Carbide Corporation, New York, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,253

Int. Cl.² F16L *11/00*

U.S. Cl. 138—103 **17 Claims**



1. A prepackaged shirred tubular casing article comprising a shirred casing length having an internal bore, an unshirred portion and having a sizing means confined within said unshirred portion of said casing length, said sizing means having an outer perimeter larger than the inner perimeter of unstretched unshirred casing length.

4,007,762

SELVAGE FORMING DEVICE FOR A WEAVING LOOM

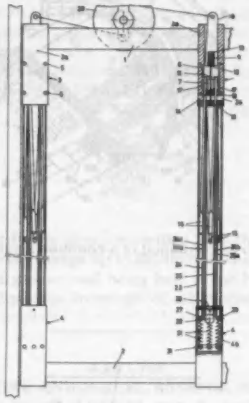
Cornelis van Donk, Mortel, Netherlands, assignor to Ruti-Te Strake B.V., Deurne, Netherlands

Filed Dec. 24, 1975, Ser. No. 644,021

Claims priority, application Netherlands, Mar. 17, 1975, 7503167

Int. Cl.² D03C *11/00*

U.S. Cl. 139—54 **3 Claims**



1. A selvage forming device comprising a frame adapted to be connected to a heald of a loom and to guide at least one warp thread, wherein the improvement comprises two superimposed members rockably mounted in the frame, and an actuating arm secured to one member for rocking said member, the members being hinged together so that rocking of one member causes the other member to rock in the opposite sense, each member carrying one of a cooperating pair of needles for guiding binding threads, the rocking motion of the members being such as to cause scissors motion of the pair of needles in a plane transverse to the warp threads, and the frame being provided with a plurality of vertical wires under tension for guiding the warp threads.

4,007,763

NARROW FABRICS

John Sellers, Chorley; Mary Griffiths, Heywood, and Thomas Harry Dyer, Manchester, all of England, assignors to Thomas French & Sons Limited, Manchester, England

Filed Mar. 20, 1975, Ser. No. 560,169

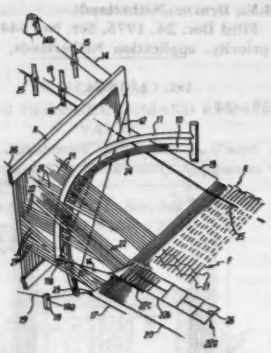
Claims priority, application United Kingdom, Mar. 21, 1974, 12747/74

Int. Cl.² D03D *49/50, 47/08, 1/06*

U.S. Cl. 139—116 **23 Claims**

1. The method of weaving a narrow fabric having a first weft of relatively stiff form, a second weft which has a high coefficient of friction relative to said first weft, and a multiplicity of warp yarns, including the steps of creating a shed, inserting a weft into said shed, beating-up the inserted weft, changing the shed and inserting a successive weft, beating-up the said successive weft, and repeating the steps to produce a woven fabric, the said weft insertion steps comprising inserting said first weft in certain warp sheds only and said second weft only

in the other warp sheds, the said warp sheds being successively formed in the same plane thereby to enable said first and said



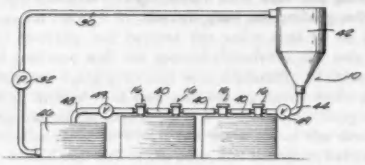
second wefts to be contained in a common single weft plane in the fabric.

4,007,764

AUTOMATIC FLUID FILLING DEVICE FOR BATTERIES

Royal F. Bandemor, Menomonee Falls, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Feb. 9, 1976, Ser. No. 656,516
Int. Cl.² B65B *3/26*
U.S. Cl. 141—35 9 Claims



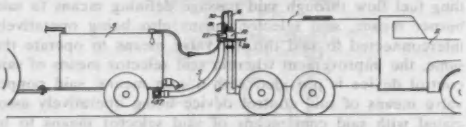
1. An automatic fluid filling device for maintaining fluid at a desired level in a battery cell having a cell opening, said device comprising a member which is removably insertable into the battery cell, said member including wall means having a first portion sealingly engaging the battery cell opening, said wall means also having a second portion located above said first portion, said second portion partially defining a generally air-tight chamber located above the battery cell opening, said second portion including an aperture and a removable cap which sealingly engages said aperture for allowing access to the fluid in the battery cell, said wall means further having a third portion partially defining a passage located below and in communication with said chamber and in communication with the battery cell for affording fluid flow from said passage to the battery cell, said third portion including an inlet for affording flow of a fluid into said passageway and also including an outlet for affording flow of the fluid out of said passageway, said member also including a fluid level control tube having an upper opening extending into and being in communication with said chamber and having a lower opening extending into the battery cell to the general level at which the fluid is desired to be maintained in the battery cell.

4,007,765

SHUT OFF AND VENTING SYSTEM FOR A CONDUIT TRANSFER LINE

Paul M. Bellows, P.O. Box 511, Battle Ground, Wash. 98604

Filed Nov. 7, 1975, Ser. No. 629,778
Int. Cl.² B65B *31/00*
U.S. Cl. 141—59 7 Claims



1. A shut off and venting system simultaneously stopping fluid flow in one conduit segment and venting a remaining communicating conduit segment of a conduit system extending between two tanks, said shut off and venting system comprising,

a fluid receptacle in communication with both conduit segments, said receptacle having a vent and fluid intake and discharge openings,

a valve assembly simultaneously closing said vent and opening said intake opening in one position whereby fluid is communicated from one conduit segment to the remaining conduit segment and in a second position closing the intake opening of the receptacle and opening the vent thereby venting said remaining conduit segment,

switch means actuated upon the level of a tank being filled by the conduit system reaching a desired height, and

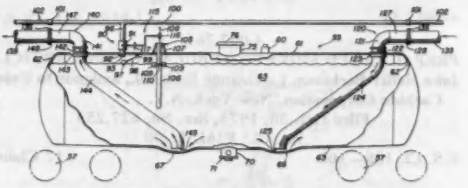
valve means in circuit with said switch means and operable to control a pressure responsive motor actuating said valve assembly whereby said assembly is positioned automatically.

4,007,766

VAPOR VENT COLLECTION LINE FOR TANK CARS

Doug Hurst, Montreal West, Canada, assignor to General American Transportation Corporation, Chicago, Ill.

Filed Feb. 25, 1976, Ser. No. 661,098
Int. Cl.² B65B *3/04*
U.S. Cl. 141—98 8 Claims



1. A railway tank car for interconnection in fluid communication with associated tank cars by flexible connecting conduits for accommodating consecutive loadings, unloading, and transportation of expandable ladings, said tank car comprising a wheeled chassis structure provided with chassis coupling means for coupling to the chassis of associated cars, a tank mounted on said chassis structure, two lading conduits respectively coupled to said tank in fluid communication therewith, each of said lading conduits having an outer end extending outwardly from said tank adjacent to the top thereof and an inner end extending into said tank and terminating near the bottom thereof, a gas vapor vent coupled to said tank in fluid communication therewith for venting gas vapor from said tank, valve means positioned in said gas vapor vent for sealing said vent to trap gas vapor in said tank, means for sensing the level of liquid lading in said tank during the filling thereof through one of said lading conduits, and control means responsive to said level sensing means for operating said valve means to close said valve means when the liquid lading

reaches a predetermined level, continued filling of said tank through said one lading conduit after the closing of said valve means causing compression of gas vapor trapped above said liquid lading to a pressure at which occurs outflow of the liquid lading through the other of said lading conduits at a rate equal to the rate of inflow of liquid lading through said one lading conduit, whereby said tank may be loaded and unloaded through either lading conduit.

4,007,767

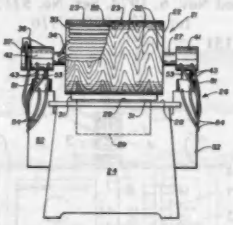
HIGHSPEED ROTARY BRANDING PROCESS HAVING INCREASED DIE LIFE

Gary C. Colledge, Compton, Calif., assignor to Colledgewood, Ltd., Compton, Calif.

Continuation-in-part of Ser. No. 440,481, Feb. 7, 1974, abandoned, which is a continuation-in-part of Ser. No. 332,298, Jan. 14, 1973, Pat. No. 3,791,290, which is a division of Ser. No. 216,061, Jan. 7, 1972, Pat. No. 3,730,081. This application July 24, 1975, Ser. No. 598,772

Int. Cl.² B44B *5/02;* **B27M** *1/06*

U.S. Cl. 144—328 **6 Claims**



1. In a process of highspeed rotary branding of pattern into a material such as hardboard, particle board, lumber or the like including the step of branding said material by passing the same under a heated rotary die at a speed effecting discoloration of the material impressed with said die, the improvement comprising the steps of:

selecting a rotary die having a pattern thereon comprised of a plurality of intricate protrusions dimensioned to brand a pattern having fine details into said material; and

maintaining the temperature of said die in the range of about 800° F. to about 900° F. during said branding step.

4,007,768

TIGHTENING DEVICE FOR THREADED SCREW PART

Ryuzo Matsushima, Tokyo, Japan, assignor to Yuugen Kaisha Matsushima Seisakusho, Tokyo, Japan

Filed June 27, 1975, Ser. No. 591,035

Claims priority, application Japan, July 3, 1974, 49-78859

Int. Cl.² B25B *15/00*

U.S. Cl. 145—50 D **1 Claim**

1. A screw driver which comprises in combination:

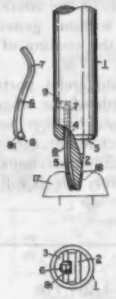
a shank with one end portion thereof fitted to a holder or a handle, and with an opposite end portion thereof provided with a flat plane or surface in the direction substantially perpendicular to the axis of said shank;

an engaging means in the shape of a symbol − to be engaged with a threaded screw, and projecting from said flat plane of said shank;

a narrow groove formed along an engaging surface of said engaging means extending in the direction substantially parallel to the axis of said shank;

a small passage formed in said shank substantially parallel to but offset radially from the axis of said shank, one end of said passage being blind within said shank, and the other end thereof being open at said flat end surface of said shank contiguous an end of said narrow groove;

a small port formed in said shank in the direction substantially perpendicular to the axis of the shank, one end thereof meeting the blinded position of said small passage, and the other end thereof being open at the peripheral surface of said shank; and



a bow-shaped plate spring extending from the blind portion of said small passage up to the tip of said engaging means along said groove, and being held in the blind portion of said small passage by means of self-resiliency.

4,007,769

TIRE AND WHEEL ASSEMBLIES

Leslie Vernon Powell, Lichfield, and Reginald Harold Edwards, Sutton Coldfield, both of England, assignors to Dunlop Holdings Limited, London, England

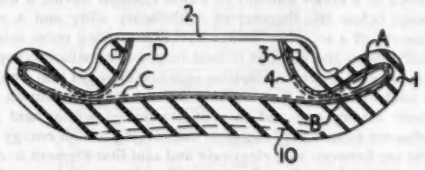
Continuation of Ser. No. 443,530, Feb. 19, 1974, abandoned, which is a continuation of Ser. No. 150,558, June 7, 1971, abandoned. This application Oct. 29, 1975, Ser. No. 626,707

Claims priority, application United Kingdom, June 20, 1970, 30034/70

The portion of the term of this patent subsequent to June 19, 1990, has been disclaimed.

Int. Cl.² B60C *17/00*

U.S. Cl. 152—330 RF **18 Claims**



1. A pneumatic tire and wheel assembly capable of running in a completely deflated condition in which opposing portions of the interior of the tire contact each other when run in that condition, said tire and wheel assembly comprising:

a wheel having a wheel rim with a pair of annular flanges, a pair of bead seats adjacent said flanges and a well to permit a tire to be mounted on the rim, means on said rim for physically restraining the beads to prevent the tire beads from falling into the well;

a pneumatic tire on said rim, said tire having a pair of beads each of which has a toe, a tread portion whose width is greater than the width of the wheel rim measured between the flanges, a breaker, an aspect ratio between 30% and 75%, a smoothly curved curvilinear interior surface extending from one bead toe to the other bead toe, the entire interior surface of the tire being free of intermediate protruding supporting structure;

said rim and said tire defining a single open inflation chamber therebetween, said chamber being free of intermediate supporting structure so that said tire can be run in a completely deflated condition on the rim with opposing

portions of the interior of the tire in contact with each other;

an immobile coating of lubricating material disposed on the interior surface of the tire so that when the assembly is run in a completely deflated condition relative movement of contacting portions of the interior surface of the tire will be facilitated, without generation of an undue amount of heat, by the coating of lubricating material therebetween; and

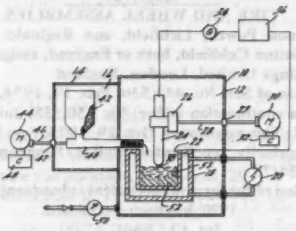
the combination of said tread portion, whose width is greater than the width of the wheel rim measured between the flanges, said breaker, said aspect ratio, said single open inflation chamber, the immobile coating, and said means for physically restraining the beads provides a tire and wheel assembly which will run in a completely deflated condition.

4,007,770

SEMI-CONSUMABLE ELECTRODE VACUUM ARC MELTING PROCESS FOR PRODUCING BINARY ALLOYS

George A. Timmons, Ann Arbor, Mich., assignor to Amax Inc., New York, N.Y.

Filed Mar. 5, 1975, Ser. No. 555,608
Int. Cl.² B22D *27/02*; C22B *4/06*
U.S. Cl. 164—52 12 Claims



1. A process for forming homogeneous binary alloys composed of a major amount of a first element having a melting point below the liquidus of said binary alloy and a minor amount of a second element having a melting point substantially above the liquidus of said binary alloy which comprises the steps of separately feeding said first element into a mold at a controlled rate, forming said second element into an electrode having one end thereof positioned within said mold adjacent to said first element, discharging a high energy electric arc between said electrode and said first element to effect a melting of said first element and said second element forming a molten pool, and feeding said first element and said second element to said mold at rates which are proportional to their concentration in the binary alloy desired.

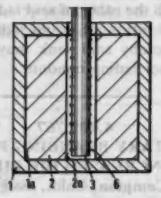
4,007,771

PROCESS FOR THE PRODUCTION OF ALUMINUM

Matthias Welsch, Dammstr. 1, 415 Krefeld-Uerdingen, Germany

Filed Jan. 13, 1975, Ser. No. 540,189
Claims priority, application Germany, Jan. 15, 1974, 2401654
Int. Cl.² B22D *13/00*, *27/04*
U.S. Cl. 164—56 5 Claims

1. A method for the production of aluminum by refining an aluminum alloy by centrifuging with controlled cooling which comprises melting an Al-X alloy, wherein the X-component of said alloy has a higher specific weight than aluminum and forms an eutectic mixture with aluminum whereby the composition of the starting melt is on that side of the eutectic mixture rich in aluminum, and radially cooling said melt from the inside to the outside by blowing a cooling medium onto the



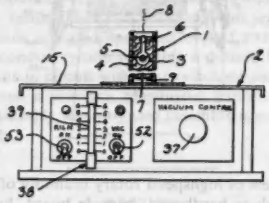
inner surface of said melt while being under the effect of the centrifugal force.

4,007,772

APPARATUS FOR VACUUM PRECISION CASTING

Donald O. Laedtke, 2400 W. Roberts Ave., and Myron W. Jackson, 430 S. Christine, both of Appleton, Wis. 54911

Filed Nov. 6, 1974, Ser. No. 521,272
Int. Cl.² B22D *27/16*
U.S. Cl. 164—151 10 Claims



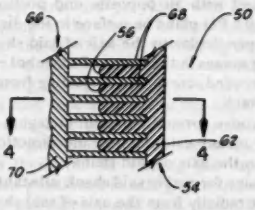
1. An apparatus for investment casting comprising a support having a vacuum opening means located centrally of the support, an investment casting means to be located in overlying relationship to said opening means, and a high volume flow, low pressure level vacuum source having means for establishing a continuous flow and connected to said opening means to create a low level vacuum on the investment casting, said source establishing a vacuum on the order of 600 mm of water gauge and a flow on the order of 3.9×10^3 CM^3/s.

4,007,773

METHOD FOR ENGINE DAMPENING

Eugene C. McCormick, P.O. Box 706, Wellington, Kans. 67152

Division of Ser. No. 469,427, May 13, 1974, Pat. No. 3,926,156. This application May 19, 1975, Ser. No. 578,401
Int. Cl.² F02F *1/30*
U.S. Cl. 165—1 2 Claims



1. A method of dampening vibrations of the cooling fins of an engine having cooling fins on the cylinder thereof, including the steps of:

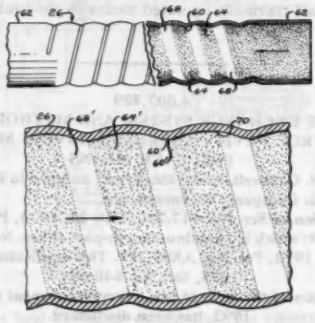
a. inserting a wedge-like member or the like between adjacent cooling fins thereby spreading the cooling fins from their normal spaced relation;
b. inserting a tooth of a cross sectionally comb-like resilient member having a width greater than the normal spaced gap between the cooling fins between the outer portion of the cooling fins;
c. removing said wedge-like member from between the cooling fins thereby releasing the cooling fins to compressibly hold said tooth of said resilient member between the cooling fins; and
d. repeating the above steps until all of the teeth of said comb-like resilient members are received between the adjacent cooling fins.

4,007,774

HEAT EXCHANGE APPARATUS AND METHOD OF CONTROLLING FOULING THEREIN

James G. Withers, Jr., Dearborn, Mich., assignor to UOP Inc., Des Plaines, Ill.

Filed Sept. 23, 1975, Ser. No. 617,453
Int. Cl.² F28F *27/02, 1/14*
U.S. Cl. 165—1 **4 Claims**



1. A method for reducing the loss in thermal conductivity caused by tubeside fluid fouling in a heat exchanger in which fluid capable of fouling the tube walls is circulating comprising fitting the heat exchanger with internally ridged tubing having an integral internal ridge shape which turbulates the fluid so as to resist deposits of a fouling layer on the upstream side of the ridging; and periodically reversing the flow direction of the tubeside fluid through the internally ridged tubing to remove at least a substantial part of the fouling layer from the portions of the tube which were previously downstream of the ridging.

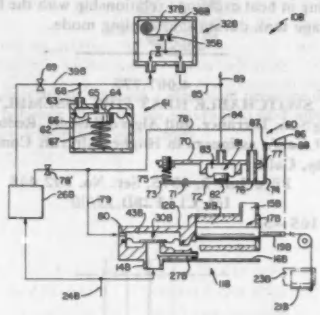
4,007,775

HEAT EXCHANGE SYSTEM AND METHOD AND CONTROL DEVICE THEREFOR HAVING MOTION FEEDBACK MEANS

Edward N. Caldwell, Knoxville, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 517,740, Oct. 24, 1974, Pat. No. 3,973,619, and a continuation-in-part of Ser. No. 419,606, Nov. 28, 1973, Pat. No. 3,880,229. This application Dec. 15, 1975, Ser. No. 640,685
Int. Cl.² G05D *23/00*
U.S. Cl. 165—1 **3 Claims**

1. A method for operating a heat exchange system for a zone comprising the steps of providing a source of heat exchange output fluid for effecting a heat exchange function in said zone, providing a source of return fluid resulting from said output fluid providing its heat exchange function in said zone, controlling the amount of flow of said output fluid from said source that is to be utilized for said heat exchange function in said zone by a thermally operated means in relation to the temperature of said thermally operated means, sensing the temperature effect of said heat exchange function in said zone with a sensing means in relation to a predetermined temperature that said heat exchange system is to provide in said zone, directing one of said output fluid and said return fluid to said thermally operated means by control means under the control



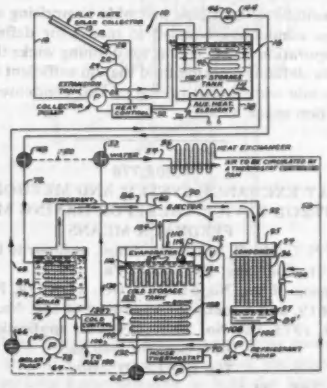
of said sensing means to cause the same to change the amount of flow of said output fluid when said temperature effect in said zone deviates from said predetermined temperature a certain amount, and causing said control means to operate said thermally operated means in a modulating manner with means of said control means.

4,007,776

HEATING AND COOLING SYSTEM UTILIZING SOLAR ENERGY

Kalil A. Alkasab, Wheaton, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Dec. 23, 1974, Ser. No. 535,252
Int. Cl.² F24D *11/00;* **F25B** *29/00, 27/00*
U.S. Cl. 165—18 **3 Claims**



1. In a solar heating and cooling system for an enclosed space, a solar energy collector and collector fluid circulating means to carry heated fluid from said solar energy collector to a heat storage tank and return cooled fluid from said tank to said collector; a closed circuit fluid circulating conduit means including a heat exchange portion within said heat storage tank and a plurality of valve members for selectively connecting said closed circuit fluid circulating conduit means in either a heating mode in direct circuit with heat exchange means for heating said enclosed space, or in a cooling mode in direct circuit with a heat exchange means for heating a refrigerant

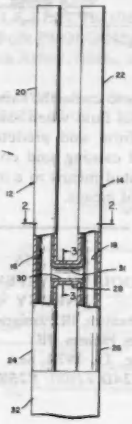
boiler which forms part of a closed refrigerant circulating system wherein refrigerant vapor produced by said refrigerant boiler is expanded in an ejector, cooled in a condenser, and used to lower the vapor pressure and temperature of refrigerant in an evaporator which is connected to the ejector, said evaporator being in heat exchange relationship with fluid in a cold storage tank, said heat exchange means for said enclosed space being in heat exchange relationship with the fluid in said cold storage tank during said cooling mode.

4,007,777

SWITCHABLE HEAT PIPE ASSEMBLY

Tsu Hung Sun, Torrance, and Algerd Basiulis, Redondo Beach, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed July 2, 1975, Ser. No. 592,448
Int. Cl.² F28D *15/00*
U.S. Cl. 165—32 **7 Claims**



7. A switchable heat pipe assembly comprising at least two heat pipe condensers coupled to means for defining a heat pipe evaporation space, means for defining wicks therein, and means for defining working fluid therein sufficient for saturating only said wick means of one of said condensers and said evaporation space means.

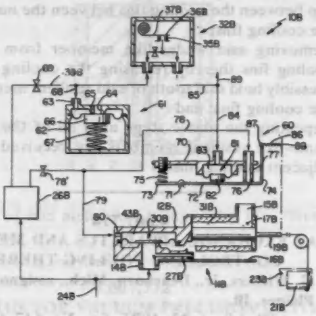
4,007,778

HEAT EXCHANGE SYSTEM AND METHOD AND CONTROL DEVICE THEREFOR HAVING MOTION FEEDBACK MEANS

Edward N. Caldwell, Knoxville, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 517,740, Oct. 24, 1974, Pat. No. 3,973,619, and a continuation-in-part of Ser. No. 419,606, Nov. 28, 1973, Pat. No. 3,880,229. This application Dec. 15, 1975, Ser. No. 640,683
Int. Cl.² G05D *23/00*
U.S. Cl. 165—34 **7 Claims**

1. A control unit for a heat exchange system or the like comprising a housing means having means adapted for receiving heat exchange output fluid from a source thereof that is to be utilized for effecting a heat exchange function in a zone and for receiving return fluid resulting from said output fluid providing its heat exchange function in said zone, thermally operated means carried by said housing means adapted to control the amount of flow of said output fluid from said source that is to be utilized for said heat exchange function in said zone in relation to the temperature of said thermally operated means, and control means adapted to be controlled by a zone temperature sensing means for directing one of said output fluid and said return fluid to said thermally operated means to cause the same to be adapted to change the amount of the flow of said output fluid when the temperature effect of said heat exchange function in said zone deviates from a



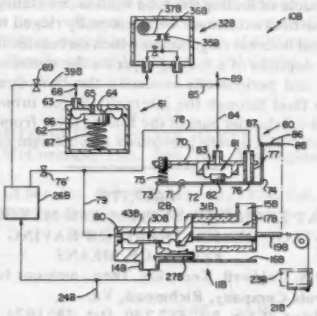
predetermined temperature a certain amount, said control means having means adapted to cause said control means to operate said thermally operated means in a modulating manner.

4,007,779

HEAT EXCHANGE SYSTEM AND METHOD AND CONTROL DEVICE THEREFOR HAVING MOTION FEEDBACK MEANS

Edward N. Caldwell, Knoxville, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 517,740, Oct. 24, 1974, Pat. No. 3,973,619, which is a continuation-in-part of Ser. No. 419,606, Nov. 28, 1973, Pat. No. 3,880,229. This application Dec. 15, 1975, Ser. No. 640,684
The portion of the term of this patent subsequent to Apr. 29, 1992, has been disclaimed.
Int. Cl.² G05D *23/00*
U.S. Cl. 165—34 **4 Claims**



1. A heat exchange system comprising a zone to be treated, a source of heat exchange output fluid for effecting a heat exchange function in said zone, a source of return fluid resulting from said output fluid providing its heat exchange function in said zone, thermally operated means for controlling the amount of flow of said output fluid from said source that is to be utilized for said heat exchange function in said zone in relation to the temperature of said thermally operated means, sensing means for sensing the temperature effect of said heat exchange function in said zone in relation to a predetermined temperature that said heat exchange system is to provide in said zone, and control means controlled by said sensing means

for directing one of said output fluid and said return fluid to said thermally operated means to cause the same to change the amount of flow of said output fluid when said temperature effect in said zone deviates from said predetermined temperature a certain amount, said control means having means that causes said control means to operate said thermally operated means in a modulating manner.

4,007,780

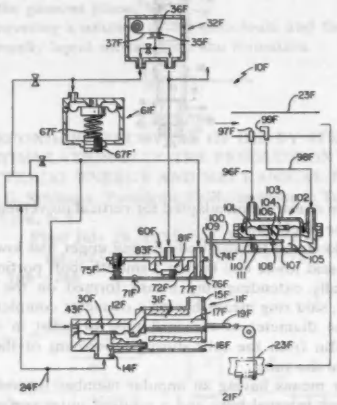
HEAT EXCHANGE SYSTEM AND METHOD AND CONTROL DEVICE THEREFOR

Edward N. Caldwell, and Douglas R. Scott, both of Knoxville, Tenn., assignors to Robertshaw Controls Company, Richmond, Va.

Filed Oct. 24, 1975, Ser. No. 625,647

Int. Cl.² B60H *1/00*

U.S. Cl. 165—39 **40 Claims**



1. A heat exchange system comprising a zone to be treated, a source of heat exchange output fluid for effecting a heat exchange function in said zone, a source of return fluid resulting from said output fluid providing its heat exchange function in said zone, thermally operated means for controlling the amount of flow of said output fluid from said source that is to be utilized for said heat exchange function in said zone in relation to the temperature of said thermally operated means, sensing means for sensing the temperature effect of said heat exchange function in said zone in relation to a predetermined temperature that said heat exchange system is to provide in said zone, and control means controlled by said sensing means for directing one of said output fluid and said return fluid to said thermally operated means to cause the same to change the amount of flow of said output fluid when said temperature effect in said zone deviates from said predetermined temperature by a certain amount, said control means having means that causes said control means to operate said thermally operated means in a modulating manner, said means of said control means comprising velocity responsive means responsive to the velocity of said flow of said output fluid from said source.

4,007,781

HEAT EXCHANGE SYSTEM

Richard M. Masters, 1 Burns Road, Lexington, Mass. 02173

Division of Ser. No. 313,934, Dec. 11, 1972, Pat. No. 3,863,710. This application Nov. 15, 1974, Ser. No. 524,057

Int. Cl.² F28F *7/00*

U.S. Cl. 165—46 **4 Claims**

1. A fluid conveying means in the form of a pipe comprising a tubular core of thermal insulation material;

an outer layer on said core of a fluid and wear resistant material;

an inner layer within said core of a vapor impermeable material, only the inner layer of said conveying means being capable of substantially completely collapsing

under conditions wherein a minimum pressure difference exists between the pressure external to said pipe and the pressure within said inner layer.

4,007,782

PARKING DEVICE FOR BLOWOUT PREVENTER

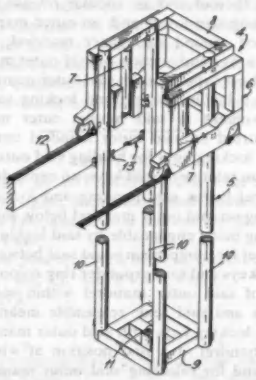
Reidar Oivind Nybo, Hvalstad, and Geir Eik, Ski, both of Norway, assignors to Finn Tveten & Co. A/S and A/S Akers Mek. Verksted, both of, Norway

Filed Mar. 17, 1975, Ser. No. 558,684

Claims priority, application Norway, Mar. 18, 1974, 740953; Mar. 11, 1975, 750804

Int. Cl.² E21B *33/03*

U.S. Cl. 166—79 **10 Claims**



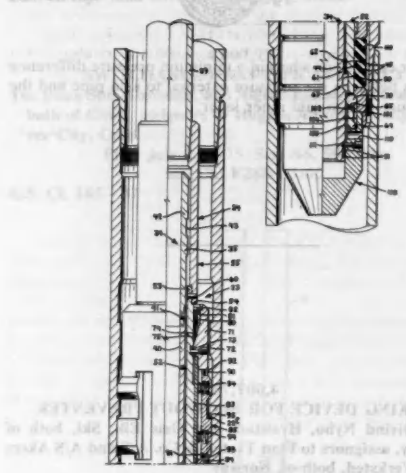
1. A parking device for a blowout preventer mounted for movement aboard a floating drilling station, the device comprising: a parking frame adapted to hold the blowout preventer with the center of gravity of the blowout preventer lying above the points at which the blowout preventer is supported on said parking frame, said parking frame at its lower portion is equipped with a testing block upon which the blowout preventer can rest, thereby allowing functional testing of the blowout preventer in a non-installed position; and control drive means for moving the blowout preventer as a unit back and forth between a parked position and an installed position for utilization on the drilling station, said control drive means including first drive means for raising and lowering said parking frame and second drive means for moving said parking frame sideways.

4,007,783

WELL PLUG WITH ANCHOR MEANS

Amareswar Amancharla, Dallas, and Carter R. Young, Lewisville, both of Tex., assignors to Otis Engineering Corporation, Dallas, Tex.

Division of Ser. No. 533,935, Dec. 18, 1974, Pat. No. 3,946,807. This application Mar. 18, 1976, Ser. No. 668,287
Int. Cl.² E21B 33/12
U.S. Cl. 166—135 5 Claims



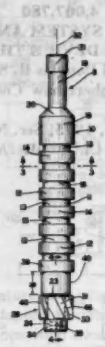
1. An expendible plug for use in a well bore to isolate a lower portion of said well bore below said plug from an upper portion of said well bore above said plug, said plug comprising: an inner mandrel having an upper end adapted to be engaged by a running tool and having spaced external seals at a lower end thereof and an annular release recess between said seals along said lower end; an outer mandrel concentrically disposed around said inner mandrel; locking means carried by a lower end portion of said outer mandrel; locating and locking keys supported on said outer mandrel for locating said plug at a landing nipple and locking said plug against upward movement in said nipple; outer mandrel locking means supported on said outer mandrel coupled with said locating and locking keys for holding said outer mandrel at an upper position relative to said keys; an expandable seal on said outer mandrel below said locating and locking keys; a seal expander ring on said outer mandrel below said seal, said seal expander ring being engageable by said locking means on said outer mandrel for compressing said seal between said locating and locking keys and said expander ring responsive to upward movement of said outer mandrel within said locating and locking keys and said seal; releasable means coupling said locating and locking keys with said outer mandrel for holding said outer mandrel at a first position at which said seal is contracted and for releasing said outer mandrel for upward movement to expand said seal; a lower end cap connected with said seal expander ring and releasably secured with said inner mandrel for closing the lower end of said plug, said inner mandrel being initially held at a first position within said outer mandrel at which said locking means on said outer mandrel is held in engagement with said seal expander ring, and said inner mandrel being releasable from said plug in said outer mandrel for downward movement to align said release recess around said inner mandrel with said locking means on said outer mandrel to release said seal ring for contraction of said seal responsive to a downward force applied to the upper end portion of said inner mandrel; said lower end cap having port means communicating to an annulus defined between said inner and outer mandrels located between said spaced seals on said inner mandrel for equalizing pressure across said plug responsive to a downward force on said inner mandrel positioning the upper one of said seals on said inner mandrel at a lower non-sealing relationship within said outer mandrel.

4,007,784

WELL PISTON AND PARAFFIN SCRAPER CONSTRUCTION

Willie L. Watson, Box 54, Fredericksburg, Ohio 44627, and Lonnie R. Watson, 347 Nold Ave., Wooster, Ohio 44691

Filed Oct. 14, 1975, Ser. No. 621,698
Int. Cl.² E21B 37/02
U.S. Cl. 166—170 12 Claims



1. Piston construction adapted for vertical movement within a well tube, including

a. an elongated tubular body having upper and lower ends with said lower end having a smooth shaft portion;

b. radially extending ring means formed on the tubular body, said ring means having a diameter complementary to the diameter of the well tube to assist in scraping paraffin from the tube during movement of the piston within the tube;

c. rotor means having an annular member formed with a smooth internal bore and a grooved outer surface, with the outer surface having a diameter complementary to the diameter of the well tube;

d. the rotor means internal bore being engageable with the smooth shaft portion of the tubular body to rotatably mount the rotor means on the lower end of said tubular body and spaced a predetermined distance below the ring means forming a turbulence zone in the space between the ring means and rotor means; and

e. the grooved outer surface of the annular member forming vane means for rotating the rotor means upon upward movement of the piston construction in the well tube for forming a turbulence in the turbulence zone which provides a sealing effect with the well tube to assist gas pressure in the well in moving the piston construction upwardly in the well tube.

4,007,785

HEATED MULTIPLE SOLVENT METHOD FOR RECOVERING VISCOUS PETROLEUM

Joseph C. Allen, Bellaire; Charles D. Woodward, Houston; Alfred Brown, Houston, and Ching H. Wu, Houston, all of Tex., assignors to Texaco Inc., New York, N.Y.

Filed Mar. 1, 1974, Ser. No. 447,106
The portion of the term of this patent subsequent to May 4, 1993, has been disclaimed.
Int. Cl.² E21B 43/24
U.S. Cl. 166—263 21 Claims

1. A method for recovering viscous petroleum including bitumen from subterranean, viscous petroleum containing formations including tar sand deposits, the formation being penetrated by at least one well in fluid communication therewith comprising:

a. injecting a normally gaseous hydrocarbon solvent heated to a temperature from about 100° F to a value less than the boiling temperature of the normally gaseous solvent

at the injection pressure and greater than ambient temperature into the formation at a pressure at which the heated normally gaseous solvent is essentially all in the liquid phase;

b. injecting a normally liquid hydrocarbon solvent heated to a temperature from about 100° F to a value less than the boiling temperature of the normally liquid solvent at the injection pressure and greater than ambient temperature into the formation at a pressure at which the heated normally liquid solvent is essentially all in the liquid phase, said normally liquid solvent being selected from the group consisting of paraffinic hydrocarbons having from five to ten carbon atoms, mononuclear aromatic hydrocarbons, naphtha, natural gasoline, and mixture thereof;

c. reducing the pressure in at least a portion of the petroleum formation contacted by the solvents to a value at which the normally gaseous solvent will be at least partly in the gaseous phase; and

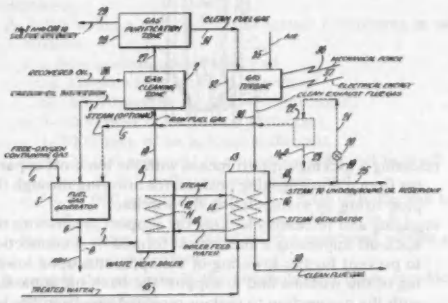
e. recovering a solution of the petroleum and the injected normally liquid solvent from the formation.

4,007,786

SECONDARY RECOVERY OF OIL BY STEAM STIMULATION PLUS THE PRODUCTION OF ELECTRICAL ENERGY AND MECHANICAL POWER

Warren G. Schlinger, Pasadena, Calif., assignor to Texaco Inc., New York, N.Y.

Filed July 28, 1975, Ser. No. 599,909
Int. Cl.² E21B *43/24*; F02B *43/12*
U.S. Cl. 166—266 **17 Claims**



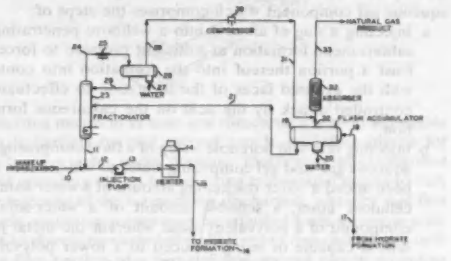
1. In a process for the secondary recovery of oil by steam stimulation the improvement comprising: (1) reacting by partial oxidation in a free-flow synthesis gas generator at an autogenous temperature in the range of about 1500° to 3500° F and a pressure in the range of about 1 to 250 atmospheres absolute, a hydrocarbonaceous feed and a free-oxygen containing gas optionally in the presence of a temperature moderating gas to produce a raw fuel gas mixture comprising H_2, CO, CO_2, H_2O, particulate carbon and one or more members of the group N_2, CH_4, COS, H_2S, and A; (2) cooling the raw fuel gas mixture from (1) by indirect heat exchange with water to produce a stream of steam, and a separate stream of cooled raw fuel gas; (3) cleaning and purifying the cooled raw fuel gas stream from (2) in a gas cleaning and purification zone to produce a clean fuel gas comprising H_2, CO and one or more members of the group, CO_2, N_2, CH_4, and H_2O; (4) introducing into the combustion chamber of a gas turbine and burning therein the stream of clean fuel gas from (3) with air to produce a stream of clean flue gas; (5) passing the stream of clean flue gas from (4) through an expansion turbine as the working fluid to develop mechanical power or electrical energy or both; (6) passing a stream of treated water in indirect heat exchange with the stream of steam from (2) and a stream of exhaust flue gas from (5) in a steam generating zone, thereby converting said treated water into steam; (7) introducing a portion of the steam from (6) into a subterranean hydrocaron formation; (8) removing and separating a hydrocarbonaceous fluid and water from said subterranean formation; and (9) treating at least a portion of the water separated in (8) and recycling same into the steam generating zone in (6) as at least a portion of said treated H_2O.

4,007,787

GAS RECOVERY FROM HYDRATE RESERVOIRS

John E. Cottle, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 18, 1975, Ser. No. 605,709
Int. Cl.² E21B *43/16*
U.S. Cl. 166—267 **10 Claims**



1. A process for recovering natural gas from a subterranean gas hydrate reservoir which comprises:

a. injecting into or adjacent to the hydrate stratum of the reservoir at least one hydrocarbon which is liquid at reservoir conditions and which has little if any tendency to form hydrates at reservoir conditions and which is injected under conditions sufficient to force said hydrocarbon into the reservoir and extract and/or dissolve hydrate gas components from the clathrate structure and leaving water as ice or cold liquid, and

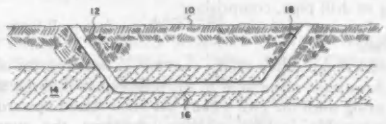
b. returning said hydrocarbon containing dissolved gases to the surface essentially saturated at reservoir conditions with the previously hydrate gas components.

4,007,788

RECOVERY OF BITUMEN FROM TAR SANDS

John Howard Striegler, Richardson, and Eddie Paul Howell, Plano, both of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed June 6, 1975, Ser. No. 584,515
Int. Cl.² E21B *7/04, 43/24*
U.S. Cl. 166—272 **1 Claim**



1. Method of recovering bitumen from a subterranean tar sand formation containing bitumen which comprises:

forming a continuous wellbore having a second section contained within said formation and first and third sections extending said second section to the earth's surface,

casing said first and third sections of said wellbore whereby said second section is open to said formation,

circulating a heated fluid via said first section through said wellbore contacting said formation and reducing the viscosity of said bitumen contained therein to render said bitumen mobile while withdrawing means whereby said

wellbore is formed at a rate to prevent plugging of said second section, and

recovering said mobilized bitumen via said third section of said wellbore.

4,007,789
ACIDIZING WELLS

Richard L. Clampitt, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sept. 10, 1975, Ser. No. 612,080
Int. Cl.² E21B *33/138, 43/27*
U.S. Cl. 166—281 **7 Claims**

1. An acid stimulation treatment process for improving hydrocarbon production from a producing well in fluid communication with a hydrocarbon-bearing subterranean formation by the introduction of alternate slugs of acid and an aqueous gel component which comprises the steps of:

a. injecting a slug of an acid into a wellbore penetrating a subterranean formation at sufficient pressure to force at least a portion thereof into the formation into contact with the exposed faces of the formation to effectuate a controlled attack by the acid on the calcareous formation,

b. injecting into said borehole a slug of a fluid comprising an aqueous gel, said gel comprising water to which there has been added a water-thickening amount of a water-soluble cellulose ether, a sensible amount of a water-soluble compound of a polyvalent metal wherein the metal present is capable of being reduced to a lower polyvalent valence state and which is sufficient to gel said water when the valence of at least a portion of said metal is reduced to said lower valence state, and an amount of a water-soluble reducing agent which is effective to reduce at least a portion of said metal to said lower valence state, and maintaining said gel in said borehole for a period of time sufficient for said gel to enter said formation and develop sufficient gel strength to remain in place in said formation and form a gel in that portion of the formation into which the acid of step (a) flowed,

c. repeating steps (a) and (b) until the desired levels or zones of the formation have been acidized, and

d. recovering hydrocarbon fluids from the subterranean formation.

4,007,790
BACK-OFF APPARATUS AND METHOD FOR RETRIEVING PIPE FROM WELLS

Jack A. Henning, P.O. Box 158, Refugio, Tex. 78377

Filed Mar. 5, 1976, Ser. No. 664,194
Int. Cl.² E21B *23/04*
U.S. Cl. 166—299 **18 Claims**

1. An apparatus for locating and applying a jarring or hammering force to a threaded connection joining sections of a string of drill pipe, comprising:

an elongated tool means for lowering in a well from a wireline;

supporting means with the tool means operable for allowing downward movement of the tool means through the drill string until the tool means has been raised upwardly to a releasable locking position engaging the supporting means with a threaded connection to support the tool means and to thereafter prevent further downward movement of the tool means in the drill string;

locating means with the supporting means and operable upon an upward movement of the tool means for locating a selected connection which is to be released to position the supporting means in the releasable locking position;

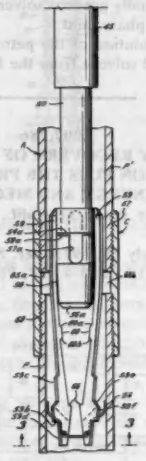
explosive means with the tool means operable by manipulation of the wireline for exerting an explosive force adjacent to the connection for imparting a jarring force to the threaded collar connection for effecting release of the threaded upper portion of the connection by reason of the explosion and a back-off torque which is applied to the drill string;

a wireline actuated jar connected to the wireline and adapted to be manipulated by the wireline to detonate the explosive means and to impart an explosive jarring blow to the connection to be released; and

said supporting means preventing downward release from the locking position during repeated jars with said wireline actuated jar to thereby assure that when the explosion detonates, it occurs in proximity to the connection to be released.

11. A method for locating and applying a jarring or hammering force to a threaded connection joining sections of a string of drill pipe, comprising:

lowering a back-off apparatus having a wireline actuated jar through a drill string with a wireline;



releasing a locking support means with the back-off apparatus from a non-engaging position for lowering through the pipe string by manipulating the wireline;

engaging and releasably locking the support means with the back-off apparatus with a recess formed by a connection to prevent further lowering of the apparatus upon lowering of the wireline and to support the back-off apparatus with the connection to sustain repeated jars from the jar; and

manipulating the wireline for discharging an explosive with the back-off apparatus for exerting the explosive force to the support means and connection to impart a jarring or hammering force to the connection through the support means for effecting release of the threaded connection when a back-off torque is applied to the drill string.

4,007,791
METHOD FOR RECOVERY OF CRUDE OIL FROM OIL WELLS

Charles M. Johnson, Little Rock, Calif., assignor to J. Carroll Baisch, Whittier, Calif.

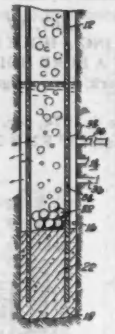
Filed Aug. 7, 1975, Ser. No. 602,900
Int. Cl.² F21B *43/22;* **E21B** *43/24*
U.S. Cl. 166—300 **4 Claims**

1. A method for recovery of crude oil from depleted oil wells, comprising:

confining water and a solvent which will float on the water in the casing of an oil well;

introduction of a chemical into the well casing which will pass through the solvent and reach the water and will react with the water to produce heat and pressure within the well to force the water and solvent out of the well casing and into the crude oil bearing formation into which

the well casing penetrates to thin out the crude oil in the formation and increase its fluidity; and releasing the



pressure in the well casing so that the thinned crude oil will enter the well casing.

4,007,792

HYDRAULIC FRACTURING METHOD USING VISCOSIFIED SURFACTANT SOLUTIONS

John J. Meister, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 2, 1976, Ser. No. 654,435
Int. Cl.² E21B *43/26, 43/27*
U.S. Cl. 166—308 **4 Claims**

1. A method for fracturing a formation around a borehole comprising

A. introducing a composition of matter comprising in admixture

a. a fluid consisting essentially of

aa. 10–90 weight percent of water,

bb. 90–10 weight percent of chloroform,

b. 1–5000 ppm of a cationic surfactant,

c. 1–5000 ppm of an anionic surfactant,

d. 50–20,000 ppm acid in a quantity sufficient to reach a pH of ≦ 4.5 in the aqueous phase, and

e. 50–20,000 ppm buffer salt in mol ratio of buffer salt to: acid component (d) in the range of 0.1:1 to 5:1,

the ppm values being based on the combined weight of water and chloroform.

B. raising the pressure in the borehole to a range in which the rock fractures,

C. maintaining a pressure for a period of 1/2 hour to 6 hours,

D. releasing the pressure, and

E. removing the composition from the borehole.

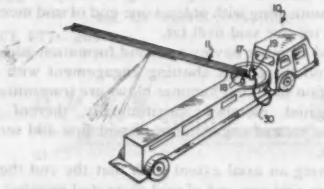
4,007,793

FIRE FIGHTING APPARATUS

Fred M. Hux, 1816 Lewis St., and Thomas Hudson, 300 Howard Ave., both of Tarboro, N.C. 27886

Filed Aug. 25, 1975, Ser. No. 607,851
Int. Cl.² A62C *27/00;* **B05B** *1/30, 1/12*
U.S. Cl. 169—25 **6 Claims**

1. A fire fighting system mounted on relatively movable sections of an aerial ladder of a fire truck and comprising a first nozzle means mounted on one section of the ladder and a second nozzle means mounted on another section of the ladder, said first nozzle means including a first frame mounted on said one ladder section, a first elongated tubular member carried by said first frame, means for supplying water under pressure to one end of said first tubular member, a first nozzle mounting means movably connected to the other end of said first tubular member, first remotely controlled fluid operating means for moving said first nozzle mounting means in at least one direction, a first adjustable nozzle carried by said first nozzle mounting means for discharging water under pressure, second remotely controlled fluid operating means for adjusting said first nozzle to vary the intensity of the water being discharged, said second nozzle means including a second frame mounted on the other ladder section in spaced relationship to said first nozzle means, a second elongated tubular member carried by said second frame, means for supplying water under pressure to one end of said second tubular member, a second nozzle mounting means movably connected to the other end of said second tubular member, third remotely controlled fluid operated means for moving said second nozzle



mounting means in at least one direction, a second adjustable nozzle carried by said second nozzle mounting means for discharging water under pressure, fourth remotely controlled fluid operating means for adjusting said second nozzle to vary the intensity of the water being discharged, whereby said first nozzle mounting means may be adjusted from a remote position to direct the water being discharged from said first nozzle to a first portion of a fire and said second nozzle mounting means may be adjusted from a remote position to direct the water being discharged from said second nozzle to another portion of the fire.

4,007,794

TOP DESICCATION OF CROP PLANTS

Ricks H. Pluenneke, Forth Worth, Tex., and Willis G. Dykes, Vicksburg, Miss., assignors to Lasco, Inc., Vicksburg, Miss.

Filed Jan. 29, 1976, Ser. No. 653,542
Int. Cl.² A01M *21/00;* **A01D** *91/00*
U.S. Cl. 171—1 **7 Claims**

1. A method for facilitating the harvestability of a root crop, such as potatoes, beets, onions, carrots, and the like, comprising the steps of:

a. allowing said root crop to substantially mature,

b. contacting the above-ground portions of said root crop with a high-voltage source of electricity so that the above-ground portions of said crop are desiccated but so that the tubular portions thereof are not harmed, and

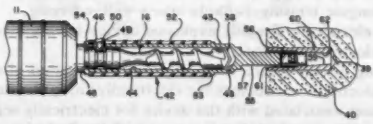
c. harvesting said root crop several days after contacting of the above-ground portions of said root crop with high-voltage electricity.

4,007,795

ATTACHMENT FOR A ROTARY-HAMMER TOOL

Alex F. Gawron, and William E. Dillon, both of Chicago, Ill., assignors to Skil Corporation, Chicago, Ill.

Filed Feb. 13, 1976, Ser. No. 658,029
Int. Cl.² A01B *33/00*
U.S. Cl. 173—50 **16 Claims**



1. An attachment in combination with a power hammer and an associated drill bit,

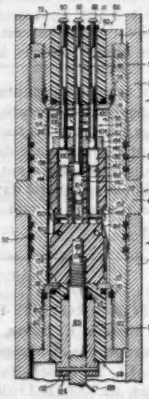
said hammer being of the type including a powered hammering mechanism,
said hammer having a nose portion adjacent an opening arranged to receive the shank portion of said drill bit when the latter is operatively attached to the power hammer,
a first formation adjacent said nose portion and accessible from the exterior of said hammer,
said first formation being connected with said hammering mechanism such that the former receives impact blows developed by the latter,
said attachment comprising,
an elongated member having a longitudinally extending bore communicating with at least one end of said member thereby to receive said drill bit,
said elongated member having a second formation adjacent said one end thereof in abutting-engagement with said first formation such that hammer blows are transmitted to said elongated member longitudinally thereof and through the area of engagement of said first and second formations,
said bore having an axial extent such that the end thereof remote from said one end of said elongated member is in spaced relationship with the working end of said drill bit when said first and second formations are in abutting engagement with each other,
said elongated member including a special hammering formation at the other end thereof and adapted to perform a special hammering function upon operation of said power hammer, whereby said special hammering function may be brought about without removing said drill bit from the power hammer.

4,007,796

EXPLOSIVELY ACTUATED WELL TOOL HAVING IMPROVED DISARMED CONFIGURATION

Gene T. Boop, 3938 Capri, Corpus Christi, Tex. 78415

Filed Dec. 23, 1974, Ser. No. 535,355
Int. Cl.² E21B *43/116*
U.S. Cl. 175—4.55 **12 Claims**



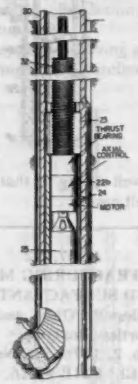
11. An explosively operated well tool comprising
an elongate housing, runable into a well, carrying
an electrically fireable explosive device having a pair of electrical terminals;
firing circuit means including first and second elongate electrical conductors for electrically firing the device;
means associated with the device for electrically separating the terminals from contact with the first and second electrical conductors thereby disarming the device; and
means for arming the device in the well including means for placing the terminals of the device in circuit with the firing circuit means including the first and second electrical conductors.

4,007,797

DEVICE FOR DRILLING A HOLE IN THE SIDE WALL OF A BORE HOLE

John D. Jeter, Iowa Park, Tex., assignor to Texas Dynamatics, Inc., Dallas, Tex.

Filed June 4, 1974, Ser. No. 476,328
Int. Cl.² E21B *7/08*
U.S. Cl. 175—26 **19 Claims**



1. A device for drilling a hole in the side wall of an existing bore hole having an axis extending in a generally lateral direction from the longitudinal axis of the existing bore hole comprising; a housing for moving through the bore hole to the desired location for the lateral hole, said housing having a longitudinal bore and an opening, an inherently curved, resilient lateral drill string conductor located in the housing with a hollow drill bit rotatably attached to one end thereof, means for moving the conductor between a first position inside the longitudinal bore of the housing for movement with the housing through the bore hole to the desired location of the hole in the side wall, and a second position with a portion of the conductor bent so that it curves out of the opening in the housing to guide a drill string moving through the conductor and hollow bit to and into the side wall of the bore hole to drill a hole therein, a lateral drill string, a portion of its length being resilient, located in the housing, means to rotationally drive said hollow bit to drill an access hole for said conductor as said conductor extends from the first position to the second position, and means for moving the drill string through the conductor and hollow bit, from the housing to and into the earth when the conductor is in the second position to drill a lateral hole in the earth.

4,007,798

HYDRAULIC JAR

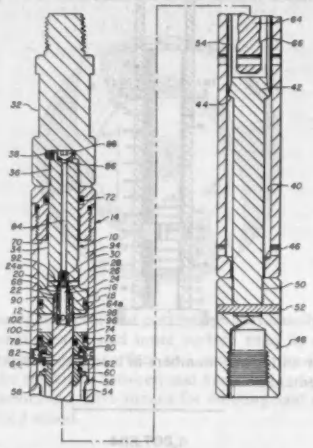
Imre I. Gazda, Saginaw, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Filed Oct. 6, 1975, Ser. No. 619,852
Int. Cl.² E21B *1/10*
U.S. Cl. 175—297 **26 Claims**

1. A hydraulic jar comprising:
tubular housing means including a cage means portion, hammer means, and a cylinder means portion;
piston means axially movable within said cylinder means portion;
bleed passage means through said piston means;
bypass passageway means through said piston means;
check valve means in said bypass passageway means limiting flow to one direction therethrough;
anvil means disposed within said cage means portion;

first sub means connected to said anvil means and adapted for connection to tool means;

second sub means attached to said piston means and adapted for attachment to tool string means; and



means for releasably maintaining said housing means in a position with said hammer means spaced from said anvil means until said piston means moves to a select, extended position and then releasing said housing means to permit striking of said anvil means by said hammer means.

4,007,799

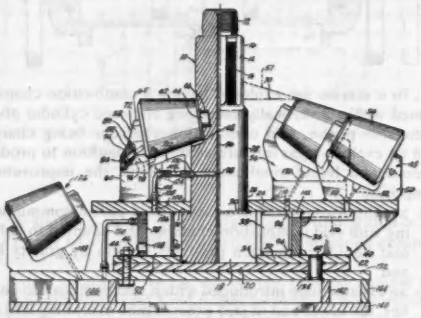
RAISE DRILL WITH REPLACEABLE STEM

Robert L. Dixon, Brea, and Robert E. Allison, Whittier, both of Calif., assignors to Smith International, Inc., Irvine, Calif.

Filed July 7, 1975, Ser. No. 593,839

Int. Cl.² E21B *9/08*

U.S. Cl. 175—340 **18 Claims**



1. A raise drill comprising:

a drive stem having coupling means at the top end of the stem for connection to a drill string;

a torque plate secured to the bottom end of the stem;

an upwardly facing shoulder on the stem intermediate its ends above the torque plate;

a cutter assembly including a frame plate having a central hole therein of diameter larger than said one end of the shaft but smaller than the shoulder, whereby the frame plate can fit on the end of the shaft and against the shoulder for transmitting only axial loads therebetween, and a plurality of mounting yokes mounted on the frame plate around the central hole each mounting yoke supporting a shaft and rotary cutter journaled on the shaft; and

detachable means securing the frame plate to the torque plate for transmitting torque from the stem through the torque plate to the cutter assembly.

4,007,800

FORCE MEASURING DEVICE

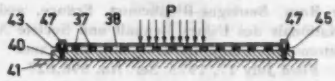
Walter Janach, Morges, and Peter Kipfer, Jegenstorf, both of Switzerland, assignors to Haenni & Cie Aktiengesellschaft, Bern, Switzerland

Filed July 15, 1975, Ser. No. 596,143

Claims priority, application Switzerland, July 17, 1974, 9922/74

Int. Cl.² G01G *5/04, 3/00*

U.S. Cl. 177—209 **3 Claims**



1. A weight measuring device, comprising a base adapted to rest on the ground and having a plane upper face; an assembly of a plurality of regularly-spaced tubular spring elements arranged on said plane upper face of said base, said tubular spring elements being equal to each other in every respect, having a substantial elliptic cross-section, and being elastically deformable, and a smaller axis extending perpendicular to said base; a pressure transmitting plate having a plane lower face overlapping said assembly and contacting each of said tubular spring elements over its full length and being secured to the edges of said base and being adapted to be loaded by said weight for transmitting it to said tubular spring elements; a gauge, secured to one side of said base; connecting means, connecting the hollow insides of said tubular spring elements together and to said gauge; the system consisting of said tubular spring elements, said connecting means and said gauge being liquid tightly closed; a liquid completely filling said system; said gauge being adapted to measure a change of volume of said liquid in said gauge, resulting from a deformation of one or a plurality of said tubular spring elements upon application of said weight on said transmitting plate, said gauge being calibrated in units of weight and said deformatins of said tubular spring element remaining in the linear domain of the spring characteristic of said tubular spring elements at least in the calibrated range of weight.

4,007,801

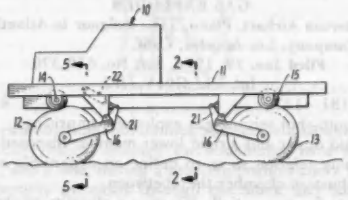
SUSPENSION FOR VEHICLES

Charles R. Vincent, San Francisco, and William H. Albee, Pleasant Hill, both of Calif., assignors to Crowley All Terrain Corporation, San Francisco, Calif.

Filed Feb. 6, 1976, Ser. No. 655,864

Int. Cl.² B60K *23/00*

U.S. Cl. 180—74 **12 Claims**



1. A vehicle for travel over off-road terrain, said vehicle having a frame; a fluid distensible roller engageable with the ground; means for rotatably mounting said roller to said frame while allowing relative vertical movement therebetween; a

support roll rotatably mounted to said frame and positioned generally above said roller to contact said roller and be supported thereon, the axis of said roll being parallel to the axis of said roller and positioned vertically offset by an angle between 5° and 19° measured from the vertical; means including a fluid cylinder for resiliently biasing said roller relative to said frame to maintain a preselected contact pressure between said roll and roller; and means for selectively adjusting the contact pressures between said roller and roll to accommodate the various road and operating conditions.

4,007,802

REMOTE CONTROL DEVICE FOR SAFETY HARNESS WEBBING WINDER

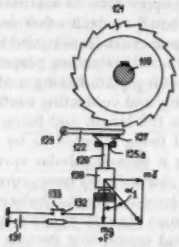
Daniel de Rosa, Boulogne-Billancourt, France, assignor to Regie Nationale des Usines Renault and Societe Anonyme dite: Automobiles Peugeot, Paris, both of, France

Filed July 17, 1975, Ser. No. 596,627

Claims priority, application France, July 24, 1974, 74.25687

Int. Cl.² B60R *21/00*

U.S. Cl. 180—82 C **2 Claims**



1. Electric remote control device for operating the winders of safety harness webbing of the type comprising a winder incorporating a webbing unwinding means and a member for locking said unwinding means mounted on a movable component of the vehicle body, an inertia member adapted mechanically to control said locking member and a solenoid adapted to be energized electrically, the electromagnetic force of said solenoid being adapted to modify temporarily the operation of said inertia member, this device being characterized in that said solenoid induces an electromagnetic force acting with a certain time-lag and substantially in the same direction as the gravity force applied to said inertia member.

4,007,803

EXPANDING DETONATION CHAMBER MULTI-SHOT GAS EXPLODER

Tom Patterson Airhart, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jan. 19, 1976, Ser. No. 650,370

Int. Cl.² G01V *1/12*

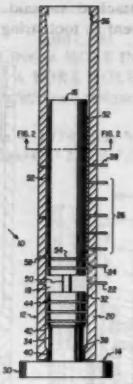
U.S. Cl. 181—117 **8 Claims**

1. A multi-shot seismic gas exploder comprising:

a. a rigid upper and a rigid lower member disposed in telescoping relation so as to define an expansible enclosed combustion chamber therebetween,

b. means for sequentially injecting a plurality of charges of combustible gas mixture into said combustion chamber at timed intervals, and

c. means for separately igniting said plurality of charges to establish a like number of successive detonation fronts within said combustion chamber during the continuous expansion thereof adapted collectively to separate said upper and lower members in a single, noncyclic, vertical movement.



4,007,804

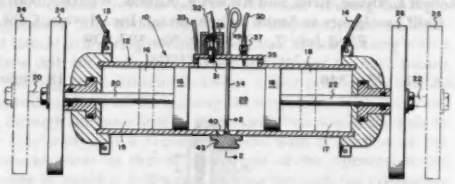
APPARATUS FOR REMOVAL OF CONDENSATION FROM A MARINE GAS EXPLODER DEVICE

Jack E. Hardison, Garland, and Alpheus A. Franklin, Dallas, both of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Oct. 6, 1975, Ser. No. 619,926

Int. Cl.² G01V *1/02, 1/10, 1/38*

U.S. Cl. 181—118 **7 Claims**



1. In a marine gas exploder having a combustion chamber formed within a vertically extending enclosed cylinder above a movable piston, said combustion chamber being charged with an explosive gas mixture adapted on ignition to produce gaseous and liquid combustion products, the improvement comprising:

a. a sump formed within a face of said piston communicating with said combustion chamber and adapted to collect said liquid combustion products therein by gravity flow and

b. an exhaust tube introduced within said combustion chamber, the lower end of said exhaust tube extending into said sump so that said gaseous combustion products flow through said sump into said lower end and said liquid combustion products are entrained therewith.

4,007,805

CAVITY PRODUCING UNDERWATER SOUND SOURCE

Rufus K. Reber, Washington, D.C., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

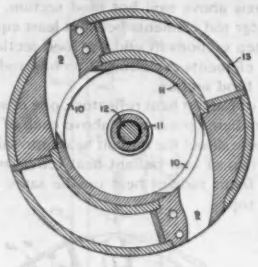
Filed Jan. 29, 1960, Ser. No. 5,565

Int. Cl.² G01V *1/04, 1/38;* H04B *1²/00*

U.S. Cl. 181—120 **14 Claims**

1. An acoustical source for minesweeping operations comprising a stator having outer and inner surfaces which are

surfaces of revolution and an open port connecting said outer and inner surfaces, an external rotor adapted to be rotated around said outer surface of said stator and having outer and inner surfaces which are surfaces of revolution with at least one open port of non constant cross-section connecting said



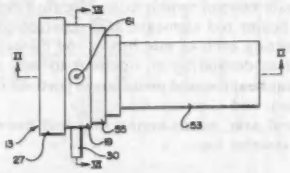
inner and outer surfaces, said port being substantially larger in cross-sectional area at said inner surface than its cross-sectional area at said outer surface and, said rotor having appreciably greater thickness between said inner and outer surfaces than said stator; and drive means for rotating said rotor at a predetermined speed.

4,007,806

HEATED STETHOSCOPE

Eugene R. Nobles, Jr., 4184 Gwynne Road, Memphis, Tenn. 38117

Filed Apr. 7, 1976, Ser. No. 674,652
Int. Cl.² A61B 7/02
U.S. Cl. 181—131 **12 Claims**



1. A stethoscope for conveying sounds from within a patient's body to a medical examiner, said stethoscope comprising:

a. head means for being selectively pressed against the patient's body, said head means including a body member having a hollow interior and having an opened end communicating with said hollow interior, said head means including a diaphragm member extending across said opened end of said body member for selectively contacting the patient's body to pick up sounds from within the patient's body;

b. transfer means attached to said head means for transferring any sound picked up by said diaphragm member of said head means to the medical examiner;

c. heating means mounted within said hollow interior of said body member of said head means substantially adjacent said diaphragm member thereof for heating said diaphragm member; and

d. a source of electrical power communicatively attached to said heating means for causing said heating means to heat said diaphragm member of said head means.

4,007,807

LADDER STABILIZER

Kenneth W. Pogwizd, 16 W. 709 56th Place, Clarendon Hills, Ill. 60514

Filed May 27, 1975, Ser. No. 580,664
Int. Cl.² E06C 7/42, 5/36
U.S. Cl. 182—109 **4 Claims**

1. A universal ladder stabilizer system for straight ladders having side rails, comprising:

anchor means,

flexible connecting means,

said flexible connecting means extending between a ladder and said anchor means;

means to removably couple said connecting means to the side rails of said ladder; and

slip preventing means,

said slip preventing means fixedly attached at the lowermost portion of each said side rail,

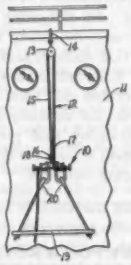
said slip preventing means comprising non-slid surface means at said lowermost portion of each said side rail to prevent slippage of said ladder on non-penetrable surfaces and alternatively positionable ladder prong means which are positionable directly under said non-skid surface means in abutment therewith to more effectively prevent slippage of said ladder on penetrable surfaces.

4,007,808

LINE SECURING DEVICE

George R. Conley, and Gerald F. Conley, both of 2436 S. Holloway St., Fresno, Calif. 93725

Filed Jan. 8, 1975, Ser. No. 539,346
Int. Cl.² E04G 1/18
U.S. Cl. 182—142 **4 Claims**



1. In combination with a block and tackle assembly including a pulley block, adapted for attachment to a means of support, and a line, having a securing portion and a free portion, operably extended through the block and back upon itself, a line securing device comprising a rigid metal rod extended to form a substantially straight first portion, bent substantially normal to itself and then return bent to form a workload supporting first loop, extended back past the first portion and return bent to form a second loop to which the

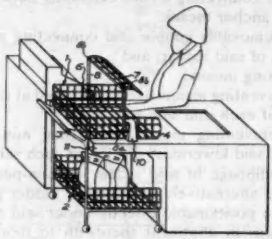
securing portion of the line is adapted to be fastened, extended back past the first portion and return bent to form a workload supporting third loop laterally spaced from the first loop and bent substantially normal to itself to form a substantially straight second portion in substantial axial alignment with the first portion; a cross piece borne by the second loop of the rod in substantial axial alignment with the first and second portions of the rod and against which the free portion of the line is adapted to be constrained, the free portion then being looped over the first and second straight portions in succession to secure the line in supporting relation to a workload borne by the first and third loops; and a pair of line retaining rings, having spring closures, individually fastened on the rod between the first portion and the second loop and between the second loop and the second portion.

4,007,809

SYSTEM FOR HANDLING GOODS IN SELFSERVICE SHOPS

Pehr-Gunnar Heine Göransson, Malmo, Sweden, assignor to Bag System AB, Sweden

Filed Aug. 27, 1975, Ser. No. 608,180
Int. Cl.² A47F *10/00*
U.S. Cl. 186—1 AC **4 Claims**



1. A system for handling goods in selfservice shops, comprising a shopping trolley and a cash counter, at least one basket, mounted on said trolley and consisting of a bottom and a plurality of side walls, mounting means for mounting one of said side walls of said basket for pivotal movement between a lowered closed position and a raised open position, means defining a compartment in said cash counter, corresponding to the size of said trolley and designed to receive said trolley, and control means, mounted on said cash counter for co-operation with said trolley to move said pivotable side wall from the lowered to the raised position as said trolley is introduced into said compartment, said mounting means comprising two levers, means for pivotally mounting said levers each on respectively one of two side walls of said basket, being adjacent to said pivotable side wall, and means for rigidly connecting said levers to said pivotable side wall, and in which said control means include arms for abutting and turning said levers and consequently entraining said pivotable side wall from lowered to raised position as said trolley is introduced into the compartment in said cash counter.

4,007,810

HEATER ASSEMBLY FOR A ROTATING CAFETERIA TYPE FOOD SERVICE COUNTER

Elmer R. Weddendorf, Cincinnati, Ohio, assignor to B/W Metals Company, Inc., Fairfield, Ohio

Filed Nov. 17, 1975, Ser. No. 632,459
Int. Cl.² E04H *3/04*
U.S. Cl. 186—1 R **7 Claims**

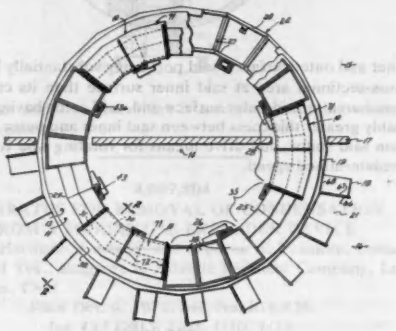
1. A rotating cafeteria type food service counter apparatus having an improved overhead heater assembly, said apparatus comprising

a generally circular food service counter adapted to rotate about a fixed center axis, said counter including a counter top adapted to receive food in a hot food section;

at least two step sections provided on said counter top in said hot food section,

a plurality of infrared type radiant heater rod elements disposed generally concentrically relative to said fixed center axis above said hot food section, the number of said heater rod elements being at least equal to the number of step sections in said hot food section, and each of said rod elements extending from one end to the other of said hot food section,

a plurality of radiant heat reflectors, one of said radiant heat reflectors being positioned above each of said heater rod elements to direct the radiant heat onto said step sections, at least two of said radiant heat reflectors being configured to focus radiant heat on the same portion of said counter top,



at least one light bulb adapted to illuminate the food in said hot food section, said light bulb being positioned in a light bulb channel interposed between two of said concentric heater rod elements, said light bulb being separately controlled relative to said heater rod elements,

said heater rod elements, heat reflectors and light bulb being combined in a single overhead unit,

a separate control switch in an electric circuit for each of said heater rod elements, said separate control switches permitting each of said heater rod elements to be energized as desired by an operator to vary the amount of radiant heat focused on different portions of said hot food section, and

structural arm means connecting said overhead unit and said counter top.

4,007,811

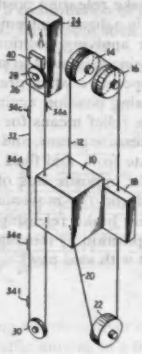
CONTROL FOR ELEVATOR

Yasuhiko Ozawa, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Feb. 24, 1975, Ser. No. 552,206
Int. Cl.² B66B *1/40*
U.S. Cl. 187—29 R **3 Claims**

1. In combination with an elevator car operable upwardly and downwardly, a control device for controlling the accurate stopping of the elevator at the various floors comprising, a flexible strip carrier movable longitudinally in opposite directions synchronously and directly proportional to the upward and downward travel of the elevator and in response to said travel, means on said strip carrier comprising floor-indicator elements spaced apart thereon at distances corresponding to distances the elevator car must travel between floors and be stopped accurately at the level of said floors and travelling with said strip carrier, sensing means at a sensing position detecting the arrival of said floor-indicator elements at said sensing position for developing a command signal to stop said elevator car upon sensing and detection of individual floor-

indication elements at said sensing position, thereby to land said elevator car accurately on the floor corresponding to the floor-indication element, and means for automatically moving the sensing means away from said sensing position and to



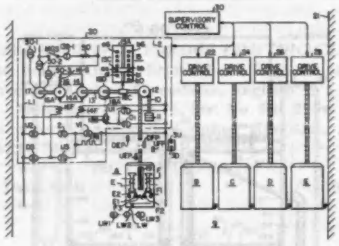
restore said sensing means to said sensing means when a sensing of the floor-indication elements is to take place in dependence upon impending arrival of said car at a floor corresponding to a given floor-indicating element and whose arrival at said sensing position is impending.

4,007,812

ELEVATOR SYSTEM

Clarence W. Nelson, Jr., Park Ridge, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 7, 1975, Ser. No. 593,815
Int. Cl.² B66B 1/18
U.S. Cl. 187—29 R **11 Claims**



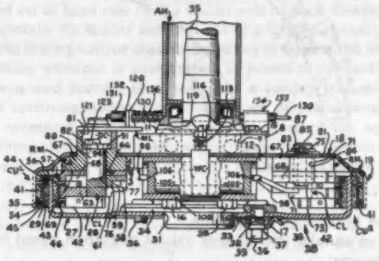
1. An elevator system, comprising:
a building having a plurality of floors,
means dividing the floors of said building into at least first, second and third zones,
at least four elevator cars,
means mounting said elevator cars for movement in the building to serve the floors,
call registering means for registering calls for elevator service,
demand means for registering a plurality of demands for elevator service in response to predetermined conditions,
availablity means conditioning each of the elevator cars in response to predetermined conditions to be available for assignment,
means providing a plurality of graded assignment levels in each of said first, second and third zones, with an elevator car entering the highest vacant assignment level of the zone it is located in when it becomes available, and
assignment means assigning available cars to demands registered by said demand means, with the available car assigned to each demand being selected in a predetermined order from available cars in the graded assignment levels of all of the zones, with the predetermined selection order being responsive to the specific demand.

4,007,813

DRUM-TYPE SERVICE AND EMERGENCY BRAKE

Glenn Talley Randol, 3 E. 2nd Ave., Mountain Lake Park, Md. 21550

Filed Dec. 10, 1974, Ser. No. 531,242
Int. Cl.² F16D 53/00
U.S. Cl. 188—76 **12 Claims**

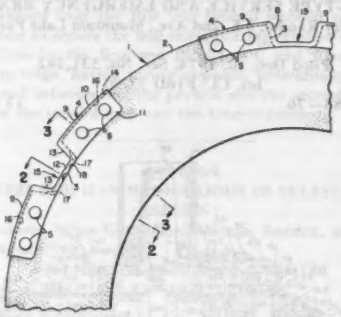


1. A drum-type brake for motorized vehicular equipment, having a drum provided with a peripheral braking flange defining opposed outer and inner friction faces and corotatable with a vehicle road wheel, a stationary support member mounted on a portion of the vehicle, a caliper unit characterized by radial-operating outer and inner lined brake shoes in circular ring sector profile which straddle-mount the drum's flange to brake the same, wherein the improvement comprises structure defining: reciprocative mechanism including a pair of interfitting members connected to said shoes, respectively, and movable relative to each other to draw said shoes toward each other into frictional braking engagement with the friction faces, respectively, on said drum's flange, a rotatable shaft journaled in said mechanism, a rotatable cam-lever carried on the inner end of said shaft and having operative interposition with respect to confronting working portions on said interfitting members, respectively, to force the latter apart and thereby drawing said shoes into braking engagement as aforesaid, and an elongated arm projecting from said cam-lever; a wheel-cylinder having a piston engageable at one end with the free end of said cam-lever arm to rotate the same in one direction, a variable pressure control chamber continuously communicating with the other end of said piston, a source of pressurized fluid communicable with said control chamber to operatively energize said piston to effect service braking, a normally compressed spring operably disposed in said control chamber to continuously react on said piston to maintain said shoes in nonbraking contact with the friction faces, respectively, on the drum's flange when the brake is in released condition whereby a high level of frictional coefficient is maintained by wiping away materials having a friction-reducing effect, and automatic take up is effected by said spring to compensate for lining wear to prevent delayed braking action; a manually-operated lever journaled on the outer end portion of said shaft exteriorly of said support member; a one-way mechanical drive operably incorporated between the outer end portion of said shaft and manual lever whereby the latter is effective to rotate said shaft in said one direction; and a manual control mechanically-linked to the free end of said manual lever to rotate the same and shaft-connected cam-lever to effect emergency (parking) braking in cooperation with or independently of operative energization of the wheel-cylinder piston to effect service braking.

4,007,814
CARBON BRAKE DISK WITH CAST KEYSLOT REINFORCEMENT MEMBERS

Robert E. Berger, North Canton, Ohio, assignor to Goodyear Aerospace Corporation, Akron, Ohio

Filed Feb. 5, 1976, Ser. No. 655,582
Int. Cl.² F16D 65/12
U.S. Cl. 188—218 XL 12 Claims



1. A brake disk comprising:

A. an annular friction disk means of carbon based material having;

1. a plurality of substantially U-shaped keyslots spaced around one periphery of the disk and extending transversely therethrough;

B. a plurality of cast keyslot reinforcement members fixedly attached to the disk means at said keyslots each member having;

1. a substantially U-shaped center portion substantially conforming to the contour of the keyslot and in intimate contact therewith;

2. a pair of channel shaped end portions integrally formed with the center portion and receiving within the channel of each end portion, a portion of the sides and periphery of the disk means adjacent to each side of the keyslot, the walls of the end portions intimately contacting the disk means;

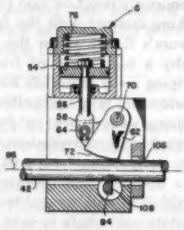
3. at least part of the walls of the center portion being substantially thicker than the walls of the end portions;

C. means fixedly attaching the keyslots to the disk means.

4,007,815
RELEASABLE LOCK FOR BRAKES

Leon R. Acre, Ovid, Mich., assignor to Midland-Ross Corporation, Cleveland, Ohio

Filed Dec. 12, 1975, Ser. No. 640,175
Int. Cl.² B60T 17/16
U.S. Cl. 188—265 4 Claims

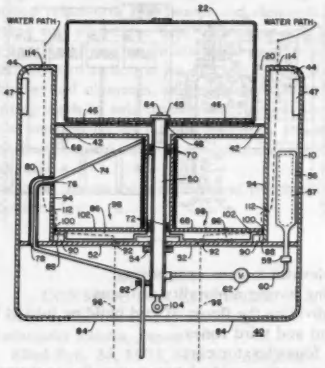


1. A locking device for a reciprocating rod brake actuator movable between brake applying and brake releasing positions, said locking device including a pivoted pawl having a pawl surface engageable with said rod by moving in an arcuate path toward and away from said rod between rod locking and releasing positions, said pawl in said locking position thereof being in engagement with said rod for releasably locking same against movement in a direction from said brake applying position toward said brake releasing position while providing free movement thereof in a direction from said brake releasing position to said brake applying position, yieldable biasing means for normally biasing said pawl to said locking position, fluid pressure means operative when pressurized for moving said pawl to said releasing position against the force of said biasing means, pressure relief means for selectively relieving pressure in said fluid pressure means, and selectively operable releasing means separate from said fluid pressure means and located generally on the opposite side of said rod from said pawl for releasing said rod for movement from said brake applying position to said brake releasing position when said pawl is in said locking position by moving said rod away from and out of engagement with said pawl.

4,007,816
PORTABLE SALVAGE LIFT APPARATUS

John H. Bayles, and Theodore J. Roster, both of Oxnard, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 505,815, Sept. 13, 1974, Pat. No. 3,940,814. This application Aug. 28, 1975, Ser. No. 608,436
Int. Cl.² B16D 57/06
U.S. Cl. 188—290 6 Claims



1. A braking apparatus for imparting a slowing force to a rotating member located underwater comprising:

a water pump having a housing inlet means, restricted outlet means and an impeller rigidly connected to said rotating member whereby the water passing through said water pump exerts a slowing force on said rotating member due to forces created on said impeller when said water pump attempts to expel water through said restricted outlet means, said impeller including impeller blades rigidly attached to a flange that is rigidly attached to said rotating member, said flange forming an upper portion of said water pump housing, said upper portion of said water pump housing being capable of rotating with respect to a lower portion of said water pump housing.

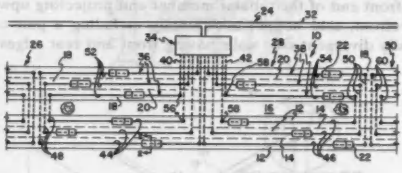
4,007,817
ROADWAY FOR SUPPLYING POWER TO VEHICLES AND METHOD OF USING THE SAME

John G. Bolger, Jr., 460 Tahos Road, Orinda, Calif. 94563

Continuation of Ser. No. 345,332, March 27, 1973, abandoned, which is a continuation of Ser. No. 146,213, May 24, 1971, abandoned. This application Jan. 9, 1974, Ser. No. 431,924

Int. Cl.² B60J 9/00

U.S. Cl. 191—10 8 Claims



1. A roadway having a surface layer of traffic bearing material, a first lane for traffic moving in a first direction, a second lane for traffic moving in the opposite direction, and means for inductively coupling power to vehicles on the roadway comprising

a power supply,

a power source having one section for coupling energy to vehicles moving in the first direction and another section for coupling energy to vehicles moving in the opposite direction, each power source section comprises a source core having a central section in the traffic bearing material and a pair of lateral sections adjacent the surface of the traffic bearing material providing a recess therein, and a source conductor disposed in the recess, and

means connecting the ends of the source conductor in circuit with the power supply for passing electrical energy through the power source.

4,007,818
NEW OR IMPROVED TORQUE LIMITING CLUTCH

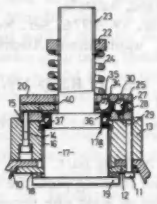
Olaf John Barclay Orwin, Birmingham, England, assignor to Gib Precision Limited, Cirencester, England

Filed June 12, 1975, Ser. No. 586,279

Claims priority, application United Kingdom, June 13, 1974, 26229/74; Apr. 5, 1975, 14050/75

Int. Cl.² F16D 43/20

U.S. Cl. 192—56 R 20 Claims



1. A torque limiting clutch comprising opposed first and second members mounted for relative rotational and axial movement, a third member positioned between and mounted for rotational movement relative to the first and second members and for axial movement relative to at least one of the first and second members, the third member being provided with a torque transmitting element receiving aperture, a torque transmitting rolling element being positioned in the aperture in the third member, the first member comprising a driven member and being provided with a torque transmitting abutment for torque transmitting engagement with said torque transmitting element, another of said members comprising a driving member and being provided with a torque transmitting abutment for torque transmitting engagement with said torque transmitting element, resilient loading means to bias resiliently the first and second members towards one another and the arrangement being such that when the clutch is transmitting torque the torque transmitting element is engaged with a driving member abutment and a driven member abutment so as thereby to prevent relative rotation between the driving and driven members and so that, on the torque to be transmitted exceeding a predetermined value, the torque transmitting element dis-engages from the abutment of at least one of the driving and driven members to permit of the members rotating relative to one another and including a spacer element received in an opening in the third member and positioned between a first track axially located relative to one of the members and a second track axially located relative to another one of the members, a spacer element receiving means provided on at least one of the tracks and of such dimensions as to maintain the spacer element out of pressure contact with the tracks during torque transmittal so as to ensure the torque transmitting element is maintained in pressure contact with the driven and second members, and a torque transmitting element receiving means provided on one of said driven and second members, whereby on disengagement of the torque transmitting element from the torque transmitting abutment in the driven member the third member is caused to rotate relative to the driven member and hence cause circumferential movement of the spacer element out of the spacer element receiving means and subsequently to cause the torque transmitting element to be engaged and maintained within the torque transmitting element receiving means with the driven and second members spaced apart by the spacer elements, the torque transmitting element receiving means being of such dimensions that the torque transmitting element is maintained out of pressure engagement with the driven and second members and relative rotation between the driving and driven members is permitted when the torque transmitting element is engaged in the torque transmitting element receiving means, and wherein there are means operative only during re-setting of the clutch to move the torque transmitting element into engagement under pressure with the member of the first and second members which is unprovided with a torque transmitting element receiving means.

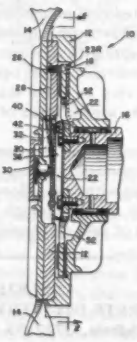
4,007,819
FAN DRIVE FLUID CIRCULATION APPARATUS

Raymond James Maci, Indianapolis, Ind., assignor to Wallace-Murray Corporation, New York, N.Y.

Filed June 20, 1975, Ser. No. 588,692

Int. Cl.² F16D 35/00, 43/25

U.S. Cl. 192—58 B 5 Claims



1. A viscous fluid fan drive assembly of the type adapted for use with the cooling system of an internal combustion engine, the fan drive assembly including a housing, the housing including a chamber, the chamber being divided by a partition into

a driving chamber and a reservoir chamber, a rotary drive disc received within the drive chamber and secured to a shaft rotatably mounted within the housing, at least one aperture in the drive disc, a viscous shear liquid within at least one of said driving and reservoir chambers, a fluid passageway between the radially outermost portion of the driving chamber and the reservoir chamber, a fluid port in the said partition, thermally responsive means for regulating the amount of shear liquid passing through the fluid port of the partition, the improvement comprising deflector means carried by the said drive disc to direct shear liquid from said reservoir chamber through the said drive disc aperture to the rear face of said drive disc when said fluid port is at least substantially closed, said deflector means extending at least partially axially of said disc aperture.

4,007,820

WHEEL HUB CLUTCH

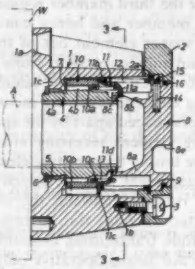
Tooru Kagata, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Japan

Filed July 28, 1975, Ser. No. 599,715

Claims priority, application Japan, Aug. 6, 1974, 49-90618

Int. Cl.² F16D *11/04*

U.S. Cl. 192—67 R **5 Claims**



1. A wheel hub clutching mechanism comprising:

a body provided therein with internal splining and to be attached to a wheel hub;

a pinion journalled within said body to be mounted on a driveable axle and provided thereon with external splining;

a clutch ring splined to said body and axially movable from a free position in which it is disengaged from said pinion to a lock position in which it is engaged with said pinion;

a follower ring splined to said body and engaged with said clutch ring;

a compression coil spring assembled within said body to urge said follower ring toward said clutch ring and urge said clutch toward the lock position;

manually operated cam means movable in one direction to retract said follower ring against the urging force of said compression spring to move said clutch ring to the free position and movable in the opposite direction to permit said follower ring to move said clutch ring to the lock position by the urging force of said compression spring; and

a connecting coil spring disposed radially concentrically with said compression spring for resiliently connecting said clutch ring with said follower ring, said spring having a substantially constant length during both the lock and free positions of said mechanism.

4,007,821

CONCRETE DELIVERY APPARATUS

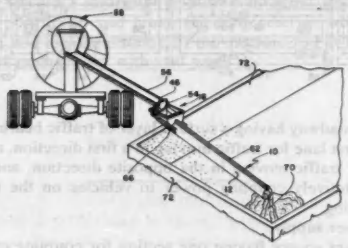
Richard A. Schiffelbein, 3727 SE. 21st St., Topeka, Kans. 66605

Filed May 5, 1975, Ser. No. 574,745

Int. Cl.² B65G *11/02*

U.S. Cl. 193—4 **1 Claim**

1. A concrete delivery accessory for use with the discharge chute of conventional concrete mixer trucks comprising an elongated tubular member having an inlet and an outlet respectively at its front and rear ends, said inlet end of the tubular member being integrally and sealingly fixed to and opening into the rear end of an upstanding and open-topped rigid hopper having a bottom wall, said tubular member being of circular cylindrical configuration with a semicylindrical forwardly projecting extension thereof constituting the bottom wall of the hopper, said bottom wall having a semicircular forward edge sealingly secured to an upstanding front end wall, said hopper including a rear end wall sealingly secured to the front end of the tubular member and projecting upwardly therefrom, said hopper additionally including a pair of upwardly divergent side walls having front and rear edges sealingly secured to the front and rear walls of the hopper and also having lower edges sealingly secured to upper edges of the semicylindrical bottom wall, said tubular member and the semicylindrical extension thereof having interiors entirely free of obstructions whereby gravitational flow of material from the hopper to the tubular member is subject to only minimal opposition, means carried by the hopper for detachably suspending the same from a concrete delivery chute, said front, rear and side walls having upper edges that terminate in a rectangular configuration in a common plane that is forwardly and downwardly inclined relative to the tubular member, and said means for suspending the hopper comprising an elongated flexible element having one end secured to one side of the hopper and its other end detachably secured to the other side of the hopper.



4,007,822

STRAND GUIDING MEANS TO BE USED IN A CONTINUOUS CASTING PLANT

Werner Scheurecker, Linz, Austria, assignor to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Linz, Austria

Filed Mar. 19, 1976, Ser. No. 668,587

Claims priority, application Austria, Mar. 25, 1975, 2266/75

Int. Cl.² B22D *11/12*

U.S. Cl. 193—35 R **6 Claims**

1. A strand guiding means to be used in a continuous casting plant comprising:

at least one first framing part;

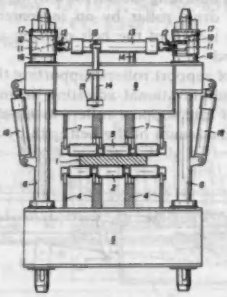
at least one second framing part, the at least one first framing part and the at least one second framing part being arranged in pairs opposite each other;

drawing anchors connecting said at least one first framing part and said at least one second framing part;

strand guiding rollers supported by said at least one first framing part and said at least one second framing part;

bushing means for each of said drawing anchors adjacent said second framing part, each of said bushing means including an outer bushing fixedly connected to the drawing anchor and an inner bushing supported on said second framing part, said outer bushing and said inner bushing having corresponding mating helical sliding faces with an angle of inclination smaller than the pertaining angle of friction; and

a pressure medium cylinder for each of the bushing means arranged to rotate said inner bushing relative to said outer



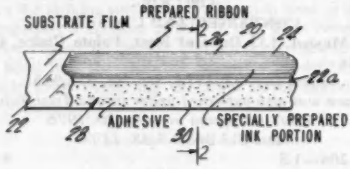
bushing, whereby said second framing part is movable to bring the strand guiding rollers accommodated thereby into and out of engagement position.

4,007,823

TYPEWRITER CORRECTION MATERIALS EMPLOYING ADHESIVES

Victor Barouh, 935 Plum Tree Road West, Westbury, N.Y. 11590, and Robert Glenn, 70-20 108th St., Forest Hills, N.Y. 11375

Filed July 5, 1973, Ser. No. 376,886
The portion of the term of this patent subsequent to Aug. 14, 1990, has been disclaimed.
Int. Cl.² B41J 29/16
U.S. Cl. 197—181 3 Claims



1. Typewriter correction material comprising a base strip of thin light transmitting non-inked material, spaced parallel coatings of adhesive on said base strip, a correction strip comprising an elongated strip of material coated with an adhesive material, a transfer strip of fluid impervious thin plastic material coated with a transfer material, said correction strip and said transfer strip being bonded to said base strip by said parallel coatings, a light transmitting wax like coating overlying said adhesive material and said transfer material, and wherein said transfer strip and said correction strip are arranged in spaced parallel relationship with said transfer strip and said correction strip each being arranged along a respective edge of said base strip with a central light transmitting window therebetween for facilitating proper alignment for correction of typewritten impressions.

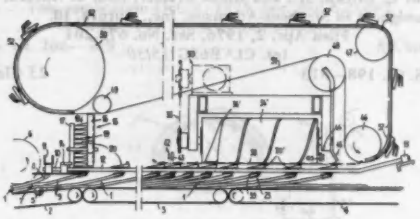
4,007,824

DEVICE FOR EQUALIZING THE SPACING OF SUCCESSIVE STREAM-FED PRINTED PRODUCTS

Walter Reist, Hinwil, Switzerland, assignor to Ferag AG, Hinwil, Switzerland

Filed May 6, 1975, Ser. No. 574,941
Claims priority, application Switzerland, May 28, 1974, 7235/74
Int. Cl.² B65G 47/31
U.S. Cl. 198—462 12 Claims

1. A device for equalizing the distance between the leading edges of successive printed products in an imbricated stream of such products, said device comprising transport means defining a transport path for the products; a plurality of spacers, each comprising driving stop means, leading abutment means and trailing abutment means; guide means for guiding said spacers in a freely movable manner in a path parallel to said transport path; storage means for storing said spacers in overlying relation and for directly delivering the lowermost of



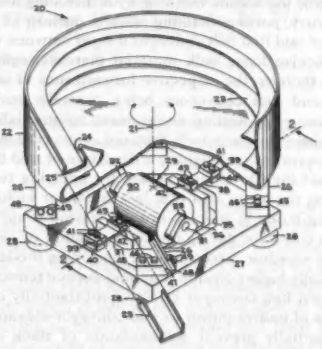
said spacers to said guide means when the driving stop means of said lowermost spacer is engaged by the leading edge of a printed product, whereby each delivered spacer is pushed by the printed product along said guide means; and brake means disposed at a distance downstream of said storage means for ensuring that each spacer abuts with its leading abutment means against the trailing abutment means of the preceding spacer.

4,007,825

VIBRATORY PARTS FEEDER DRIVEN BY ROTATING ECCENTRIC WEIGHTS

William V. Spurlin, Indiana, Pa., and Patrick J. Carroll, Upland, Calif., assignors to FMC Corporation, San Jose, Calif.

Filed Aug. 5, 1975, Ser. No. 602,060
Int. Cl.² B65G 27/00
U.S. Cl. 198—770 11 Claims



1. A vibratory parts feeder with a central vertical axis comprising a base mass being supported upon vibration isolators, a feeder bowl mass being supported above the base mass, a plurality of inclined leaf springs having one end of each spring connected to the base mass and the opposite end of each spring connected to the feeder bowl mass for supporting and guiding the feeder bowl mass above the base mass, said leaf springs being arranged to move one of the masses vertically in response to rotational twisting of one of the masses relative to the other mass about the central vertical axis, a driver being mounted on one of the masses and having a substantially horizontal shaft with a plurality of eccentric weights mounted at the end portions of the shaft for rotation therewith, a plurality of directional constraints supporting said driver for trans-

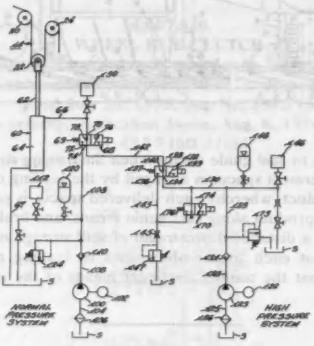
mitting to the mass upon which the driver is mounted horizontally acting forces and isolating from that mass vertical acting forces to impart to that mass oscillating rotational impulses about the central vertical axis of the feeder.

4,007,826

DUAL PRESSURE TAKE-UP APPARATUS AND SYSTEM FOR DUAL BELT CONVEYOR-ELEVATOR

Scott L. Brown, Jr., and Klaus Bremer, both of Aurora, Ill., assignors to Stephens-Adamson, Inc., Aurora, Ill.

Filed Apr. 2, 1976, Ser. No. 673,201
Int. Cl.² B65G *15/30*
U.S. Cl. 198—813 **23 Claims**



1. A dual belt conveyor-elevator for conveying loose bulk material from one level to a higher level, comprising first and second endless belt conveyors extending between respective pairs of pulleys disposed contiguous the respective levels and providing for each conveyor a forward run and a return run, the forward run of the first belt conveyor including an upwardly facing substantially horizontal entry portion, the forward run of the second belt conveyor including a downwardly facing entry portion defining with a portion of said entry portion of said first belt conveyor a bight between the conveyors to receive loose bulk material therebetween and to be elevated thereby, the respective forward runs of said first and said second belt conveyors being normally maintained in fact-to-face edge sealing engagement substantially from the region where the loose bulk material is received between said belt conveyors at said bight to a discharge of said belt conveyors at said high level, and means for applying two different tensioning modes to said first belt conveyor including a first tensioning mode in which a normal tension is applied to said first belt conveyor during normal operation of said dual belt conveyor-elevator, and a second tensioning mode in which a substantially higher tension than said normal tension is applied to said first belt conveyor effective substantially immediately upon loss of motive power to said conveyor-elevator, whereby to substantially prevent accumulation of slack in said first conveyor belt upon said loss of motive power and thereby minimizing spillage of material from between said belt conveyors upon said loss of motive power.

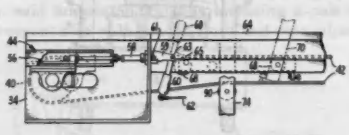
4,007,827

MODULAR CONVEYOR

David W. Mattos, 1501 Stone Creek Drive, San Jose, Calif. 95132

Filed May 22, 1975, Ser. No. 580,048
Int. Cl.² B65G *15/60*
U.S. Cl. 198—862 **4 Claims**

1. A conveyor comprising
a. a frame,
b. a drive roller mounted at one end of the frame,
c. a driven roller mounted at the other end of the frame movable toward the drive roller,
d. a belt entrained over said rollers for conveying material,
e. incremental adjusting means for moving the driven roller toward the drive roller by an incremental distance to shorten the length of the belt path by a predetermined distance, and
f. a plurality of support rollers supporting the top course of the belt, and elevational adjusting means for moving at least one of said support rollers to an elevated position increasing the length of the belt path by a distance equal



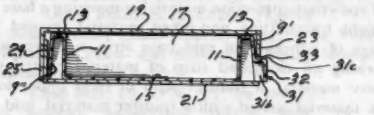
to said predetermined distance and for lifting the belt clear of said non-elevated support rollers while maintaining it in driving contact with said drive and driven rollers whereby easy access for cleaning is thereby provided, the elevational adjusting means for said one support roller including a pair of arms connected at one end to said roller and pivotally connected at the other end to said frame for pivotal motion in the direction of travel of the upper belt course and through an angle between 90 degrees and 135 degrees whereby the pressure exerted by the belt retains said one support roller in its elevated position.

4,007,828

CONTAINER AND CLOSURE

Edward Mayled, 133 Duke of Kent, Pointe Claire, Quebec, Canada

Filed Dec. 23, 1974, Ser. No. 536,923
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976
Int. Cl.² B65D *5/38, 13/06*
U.S. Cl. 206—1.5 **4 Claims**



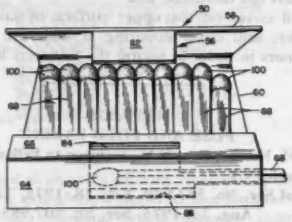
1. An improved package comprising a container and an enclosure having at least one open end; the container adapted to be inserted into the enclosure throuugh the at least one open end thereof; the container and the enclosure being of substantially equal dimensions and having cooperating means on at least one pair of adjacent walls, the cooperating means comprises projection means situated on at least one wall of the container and retaining means located in at least one adjacent wall of the enclosure, the projection means including a continuous surface portion extending outwardly therefrom, the retaining means comprising an opening situated in at least one side wall of the enclosure, the continuous surface portion of the projection means adapted to releasably engage edges of one of the at least one opening forming the retaining means, whereby engagement between the continuous surface portion and the edges of one of the at least one opening provide a positive connection between the projection means and the retaining means whereby depression of the projection means out of engagement with the retaining means must be effected in order to disengage the cooperating means.

4,007,829

SAFETY MATCH PACK

Danny W. Earnhardt, Rte. 7, Box 32, Hickory, N.C. 28601

Filed Nov. 13, 1975, Ser. No. 631,645
Int. Cl.² A24F 7/00
U.S. Cl. 206—108 7 Claims



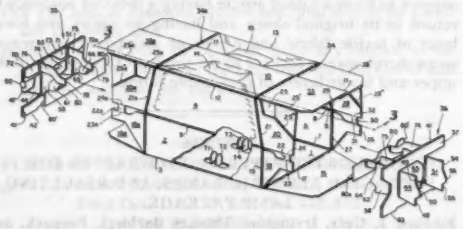
4. In a safety match pack, having a cover formed with a back cover portion and a front cover portion folded over the back cover portion and a group of matches arranged between said front and back cover portions and attached to said cover, said front cover portion being selectively displacable between a raised position to provide access to the matches in said group and a closed position covering said group of matches, the improvement comprising an ignition chamber positioned on said cover composed of a body formed separately of said cover and fixed to the back cover portion, a passageway formed in said body and opening at its outer end at an outer wall surface of said body to provide for the partial head first insertion of a match to be ignited into the chamber, a striking surface in the chamber offset from the line of entry of a match in the said chamber by way of said passage, a slot in said body opening into said chamber, and a means for effecting contact between the striking surface and the match head in the chamber comprising a member affixed to said front cover portion and located to extend through said slot to engage and press the match head into the chamber against said striking surface upon selectively displacing the front cover portion to the closed position.

4,007,830

ARTICLE CARRIER PARTITION INSERT

Rodney K. Calvert, Dunwoody, Ga., assignor to The Mead Corporation, Dayton, Ohio

Filed Nov. 17, 1975, Ser. No. 632,226
Int. Cl.² B65D 75/52
U.S. Cl. 206—175 21 Claims



1. A carrier partition insert for cushioning articles arranged in two rows of at least two articles each, said insert comprising a pair of vertically disposed main panels arranged for back-to-back disposition between the rows of articles, at least one partition tab foldably joined to each of said main panels, and a horizontally disposed spacer panel foldably joined along its side edges to the bottom edges of said main panels by serpentine fold lines to establish a spaced relation between the bottom portions of said main panels which defines article receiving cushioning pockets along the outer surface of each of said main panels.

4,007,831

CARTRIDGES CONTAINING SELF-SETTING MIXES

Frederick William Bernhardt, 39 Algernon St., Oatley, New South Wales 2223, Australia

Continuation of Ser. No. 371,653, June 19, 1973, abandoned.
This application Oct. 8, 1975, Ser. No. 620,602
Int. Cl.² B65D 25/08, 31/12
U.S. Cl. 206—219 8 Claims

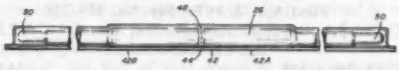
1. A cartridge containing first and second inter-active components of a self-setting mix, said cartridge comprising a first container filled with a first component of said self-setting mix so that first container assumes a generally circular cross-sectional shape, said cartridge further comprising a second container partially filled with a second component of said self-setting mix such that said partially filled second container assumes a generally convex outer surface and a generally concave inner surface, said containers extending longitudinally and lying in a side-by-side relationship, said second container being formed into a generally convexo-concave shape with said second container being positioned against a circumferential portion of said first container and adhesive means contacting said containers to join said containers to form a cartridge.

4,007,832

ELECTRONIC THERMOMETER

Seymour Paull, Natick, and Michael J. Marino, Lynn, both of Mass., assignors to Roi Corporation, Peabody, Mass.

Filed Apr. 10, 1975, Ser. No. 566,714
Int. Cl.² B65D 85/08
U.S. Cl. 206—306 6 Claims



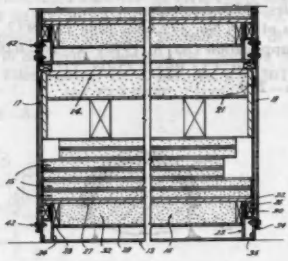
1. A probe cover for a probe of a medical electronic thermometer, wherein said probe has a substantially uniform diameter cylindrical shape along its length including a cylindrical tip at one end containing a sensor, said probe cover comprising an elongated hollow metal sleeve of uniform thickness along its length closed at one end and open at the other end, and having successive first, second and third segments with said first segment extending from said one end having the same circular cross section along its length and having an internal diameter dimensioned just larger than but close to the diameter of the cylindrical tip of the probe to provide a frictional slide fit between said first segment and said cylindrical tip, said second segment having the same circular cross section along its length and having an internal diameter greater than the diameter of said first segment and also greater than the diameter of said probe by an amount at least on the order of the thickness of the cover for providing a cylindrical air passage to said first segment when the cover is fitted on the probe, and said third segment having the same circular cross section along its length and having an internal diameter greater than the internal diameter of said second segment, said first, second and third segments of said sleeve all being constructed of a like metal material and being integrally formed.

4,007,833

BUILDING SYSTEM

Floyd E. Bigelow, Jr., P.O. Box 7064, Houston, Tex. 77008

Filed July 10, 1975, Ser. No. 594,764
Int. Cl.² B65D *85/46, 19/00;* **E04B** *1/34;* **E04H** *1/12*
U.S. Cl. 206—321 **4 Claims**



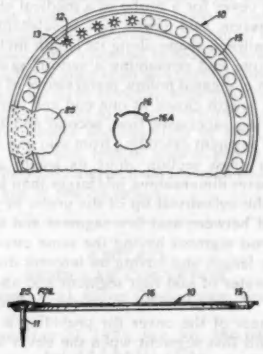
1. A knock-down building shipping package comprising,
a plurality of stacked building modules, each including a spaced apart roof and skid with building parts sandwiched between the skid and roof;
a protective member extending between the skid and roof, and surrounding said building parts,
each skid including runners extending along the periphery of opposite sides of the modules and not extending beyond the ends thereof and including at points spaced therealong a vertically extending section and horizontally extending upwardly and downwardly facing surfaces projecting from said section,
a plurality of stacking racks between each pair of skids each having a downwardly facing surface engaging said upwardly facing surface and an upwardly facing surface engaging said downwardly facing surface to support an upper module upon a lower module, and
means removable securing the stacking racks to the skids.

4,007,834

FASTENER PACKAGE

Egil Borgersen, Stockholm, Sweden, assignor to Nordisk Kartro Aktiebolag, Sweden

Filed Apr. 2, 1974, Ser. No. 457,220
Claims priority, application Sweden, Apr. 5, 1973, 7304805
Int. Cl.² B65D *85/24*
U.S. Cl. 206—338 **4 Claims**



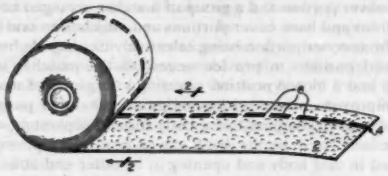
1. A fastener package for use in a fastener applicator, said package comprising:
a. a disc-shaped carrier of cardboard having a single series of evenly spaced holes arranged on a circular line of uniform radius along the peripheral portion of said carrier, said carrier being adapted at its center for driving interfit with the fastener applicator;
b. a plurality of fasteners, each having an elongated shank and a head, the shanks respectively being disposed in said holes and extending completely through said carrier, and the heads resting on said carrier on their undersurfaces to support the fasteners; and
c. a foil cover on the upper surface of said disc-shaped carrier, said cover covering at least the heads of the fasteners in order to secure the fasteners to the carrier.

4,007,835

FUSE AND FOLD FABRIC

William M. Klothe, Rye, N.Y., assignor to Pellon Corporation, New York, N.Y.

Division of Ser. No. 553,940, Feb. 28, 1975. This application Aug. 26, 1975, Ser. No. 607,985
Int. Cl.² A41D *27/02;* **B65D** *85/67*
U.S. Cl. 206—411 **11 Claims**



1. A roll for facilitating the folding over of an edge of a continuous width of textile fabric to which the material of the roll is adhesively secured to define a rounded straight line fold characterized by outer layers of juxtaposed textile fabric and a pair of inner layers of roll fabric consisting essentially of a heat sensitive strip of a monolayer of a non-woven synthetic textile fabric of short staple fibers which fabric has on only one side thereof a heat actuatable adhesive, said fabric having a constant width and at least one longitudinally running perforated line of perforations each of which has a longer longitudinal dimension than a transverse direction, which perforated lines runs parallel with a side edge of said fabric, said fabric being free of any surface interruptions other than perforated lines running parallel with a side edge, whereby when said strip of non-woven textile fibers is unwound from said roll, disposed over said textile fabric and thermally adhesively secured thereto there is provided a linear zone non-supported by said strip and a zone on each side of said perforated line supported by said strip whereby said textile fabric can be accurately and rapidly folded over at said linear zone of non-support to form a folded article having a reduced tendency to return to its original shape and having an upper and lower layer of textile fabric and a pair of juxtaposed non-woven strips therebetween secured to the resultant facing sides of the upper and lower layers of said textile fabric.

4,007,836

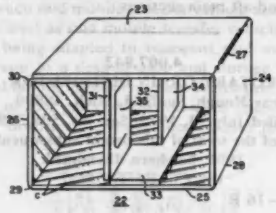
CORRUGATED-PAPERBOARD WRAPPER FOR PACKAGING ELECTRIC LAMPS, AND RESULTING LAMP PACKAGE

Edward J. Getz, Irvington; Thomas Barbieri, Peapack, and Robert J. Stauffer, Cranford, all of N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 292,238, Sept. 25, 1972, abandoned. This application Apr. 10, 1974, Ser. No. 459,739
Int. Cl.² B65D *85/42*
U.S. Cl. 206—422 **16 Claims**

1. A wrapper for protectively packaging an electric lamp bulb or a similar fragile article, said wrapper consisting essentially of an elongated open-ended sleeve that has a plurality of

connected walls and is composed of single-face corrugated paperboard the corrugations whereof constitute the inner surfaces of said sleeve and extend obliquely across the respective walls thereof at an angle of from about 10° to 35° relative to the transverse axis of the wrapper so that both the compressive strength and frictional article-retaining ability of the wrapper are enhanced.

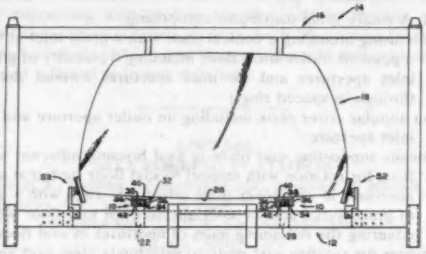


4,007,837

BOTTOM EDGE SUPPORT FOR AN ARTICLE SHIPPING RACK

James R. Rowley, Freeport, and Stephen R. Sokol, Cheswick, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Oct. 1, 1975, Ser. No. 618,607
Int. Cl.² B65D 5/48
U.S. Cl. 206—448 10 Claims



1. In a rack for shipping sheets wherein the rack is of the type having a backwall secured to a base; edge supports securely mounted on the base for supporting the sheets on edge in a generally vertical position; and end restraints to prevent longitudinal movement of the sheets, the improvement comprising:

each of the edge supports, comprising: a rigid elongated member having a

first end and an opposite second end; and means for pivotally mounting said

member on the base about a line generally normal to the backwall and parallel to the base with the first end of said member adjacent the backwall.

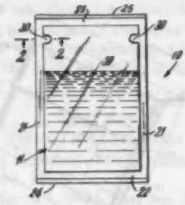
4,007,838

FLEXIBLE SEALED LIQUID CONTAINING PACKET

Nagi M. Awad, 80 Riverdale Ave., Yonkers, N.Y. 10701

Filed Oct. 1, 1975, Ser. No. 618,448
Int. Cl.² B65D 75/00
U.S. Cl. 206—484 12 Claims

1. A packet comprising front and rear walls, sealed at its lower end by a lower seam, at its sides by side seams, at its upper end by a top seam, liquid in the packet, and said side seams, each having inner edges inside said packet, one extending upwardly from the lower seam and one extending down from the top seam, and a U-shaped edge interconnecting said upwardly and downwardly extending inner edges, and disposed transversely of said upwardly and downwardly extending edges, said U-shaped edges serving to delay flow of liquid in the packet by capillary action along the insides of said side seams from reaching the upper ends of said side seams, to facilitate effectuating seaming of the upper end of the packet to form said top seam before said liquid in the packet flows to the upper ends of said side seams by capillary action and reaches the portions of said front and rear walls that form the top seam when sealed.

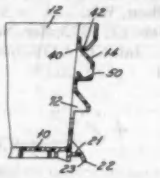


4,007,839

THREE-LEVEL FULL SLIDE-ON CONTAINER

Edward L. Stahl, Richmond, Mich., assignor to Pinckney Molded Plastics, Inc., Pinckney, Mich.

Filed Sept. 29, 1975, Ser. No. 617,592
Int. Cl.² B65D 21/02, 21/00
U.S. Cl. 206—503 18 Claims



1. A stacking container comprising a generally rectagular bottom wall, first and second side walls extending upwardly from opposite sides of said bottom wall, means providing stacking supports at a plurality of levels above said bottom wall comprising a generally horizontal rail on each side wall at each level, said rails extending substantially from front to rear of said side walls, and feet adjacent the bottom of said side walls spaced apart substantially the same distance as the rails at each level, the feet of said container being adapted to slidably engage the rails of a lower container of identical construction of each of said levels adjacent the front of said rails to enable said container to be slid rearwardly to a stacked position with respect thereto at each of said levels and to be slid forwardly for unstacking, the front of said container being open sufficiently to permit stacking and unstacking as aforesaid.

4,007,840

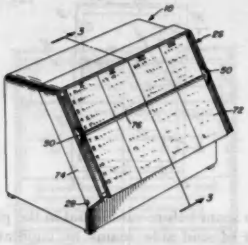
SELECTION AND RETRIEVAL SYSTEM

Alfred H. Parsons, 18 Hawthorne Road, Sea Cliff, N.Y. 11579

Filed June 24, 1975, Ser. No. 589,747
Int. Cl.² B07C 5/12
U.S. Cl. 209—80.5 8 Claims

1. A selection and retrieval system for use in conjunction with multiple independently retrievable stored components comprising, a magnetic selector, magnetically attractable areas provided at generally differing predetermined positions on the components, a carrier positioned adjacent said components and mounting said selector, means for moving said selector on and relative to said carrier for a selective alignment of the selector with the magnetically attractable area on each of said components, said magnetic selector, upon align-

ment with each of said magnetically attractable areas on said components, effecting a direct magnetic interlock therewith and independently of the components provided with magnetically attractable areas at different predetermined positions for a selection and retrieval of each component independently of



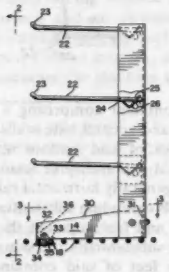
the components provided with magnetically attractable areas at different predetermined positions, and means for moving said carrier, with the magnetic selector mounted thereto, away from said stored components for a retrieval and separation of all components directly magnetically interlocked to the selector independently of the remaining components.

4,007,841

ARTICLE DISPLAY RACK

Thomas E. Seipel, Sun Prairie, Wis., assignor to Oscar Mayer & Co. Inc., Madison, Wis.

Filed Feb. 12, 1973, Ser. No. 332,024
Int. Cl.² A47F 5/00
U.S. Cl. 211—59.1 **1 Claim**



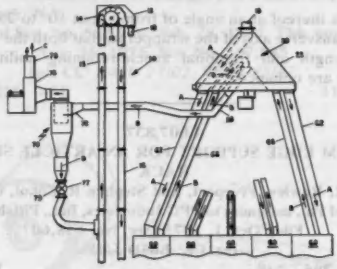
1. A display rack for mounting on shelves formed of wire rods comprising a pair of end uprights formed of right angle members with one leg of each extending forwardly and with the other legs of said uprights extending inwardly toward each other in approximately the same plane, a plurality of support bars extending horizontally between said end uprights, a plurality of article supporting rods mounted at their rear ends on said horizontal support bars and projecting forwardly therefrom, a pair of foot members each of which is attached at its heel to the bottom of one of said uprights so as to extend forwardly therefrom, and clamping means at the distal end of each foot for clamping the distal end to at least one of said wire rods of a shelf, each of said foot members having a vertical right-angle formation at said heel thereof interfitting the upright to which it is attached, each of said clamping means having an upstanding J-bolt, a clamp member carried on the lower end of each said bolt and adapted to be drawn up under at least one wire rod so as to clamp the same between the underside of said foot member and said clamp member, each of said foot members being a sheet metal stamping with a vertical fore-and-aft main section and a second vertical right angle formation on the distal end of each foot member, said fore-and-aft main section providing one leg of each of said first and second right angle formations and the remaining legs of said formations on each foot member extending inwardly toward the other foot member, and the J-formation on each bolt hooking downwardly in a notch in the upper edge of one of said fore-and-aft main sections.

4,007,842

ROTARY GRAIN DISTRIBUTOR

Richard Murray Hough, Sunfield, Mich. 48890

Filed July 23, 1975, Ser. No. 598,368
The portion of the term of this patent subsequent to Aug. 6, 1991, has been disclaimed.
Int. Cl.² B65G 65/00
U.S. Cl. 214—16 R **6 Claims**



2. A rotary grain distributor comprising:
a housing including a conical shell with a grain inlet at the top, an air outlet and a floor including a plurality of grain inlet apertures and air inlet apertures formed therethrough in spaced rings;
an annular cover plate including an outlet aperture and an inlet aperture;
means supporting said plate in said housing adjacent said floor for rotation with respect to said floor such that said apertures in said cover plate selectively align with a pair of grain outlet and air inlet apertures of said floor while covering the remaining pairs of apertures in said floor;
means for rotating said plate to selectively align said apertures therein with a desired pair of apertures in said floor; and
a grain filling chute extending between said grain inlet and said grain outlet aperture in said plate and an evacuation chute extending from said air inlet aperture in said plate to said air outlet.

4,007,843

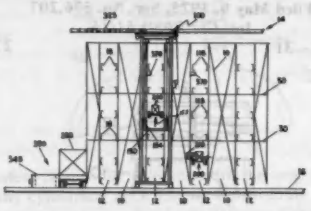
MULTI-AISLE WAREHOUSE SYSTEM WITH MOBILE LIFT HAVING CONTROL MEANS FOR AN ARTICLE TRANSFER VEHICLE

LeRoy Lubbers; William K. Stubbs, both of Grand Rapids, and Howard A. Zollinger, Ada Township, Kent County, all of Mich., assignors to Rapistan, Incorporated, Grand Rapids, Mich.

Division of Ser. No. 272,287, July 17, 1972, Pat. No. 3,880,299. This application Nov. 8, 1974, Ser. No. 521,950
Int. Cl.² B65G 1/06
U.S. Cl. 214—16.4 B **12 Claims**

1. A materials handling system comprising: a multi-level storage rack having a plurality of storage bins arranged in arrays on each level along a plurality of access aisles, pairs of horizontally spaced rails extending along and coupled to facing ends of storage bins on opposite sides of each aisle at each storage bin level, said rails extending adjacent the storage bins, a mobile vertical lift movable across the ends of the access aisles and alignable with a desired aisle, said mobile vertical lift including a lifting platform movable in a vertical direction to reach any desired storage bin level; a plurality of

self-powered mobile transfer vehicles each including drive and support wheels and independently movable along an access aisle at a selected single storage bin level, each of said mobile transfer vehicles including means thereon for transferring articles between said mobile transfer vehicle and a storage bin at the same level as said mobile transfer vehicle, said mobile vertical lift being adapted to transport said mobile transfer vehicle thereon to a desired aisle and storage bin level and dispatch said mobile transfer vehicle therefrom, wherein each of said rails of said pairs of rails includes end stops pivotally mounted to obstruct the movement of said mobile transfer



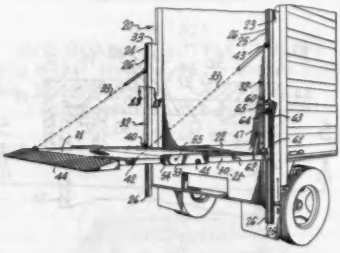
vehicle beyond said end stops when said end stops are in a first position, and wherein said mobile vertical lift includes camming means engaging said end stops of a selected aisle and aisle level for moving said end stops to a second position permitting a mobile transfer vehicle to be transferred between said mobile vertical lift and guide rails of a selected aisle and aisle level; and wherein said lifting platform of said mobile vertical lift includes a pair of horizontally spaced guide rails for supporting said mobile transfer vehicle thereon and wherein said camming means includes bridge means for coupling said guide rails on said lifting platform to said guide rails of said selected aisle and aisle level.

4,007,844

SELF FOLDING PLATFORM

William V. Perkins, Monrovia, Calif., assignor to Maxon Industries, Inc., Huntington Park, Calif.

Filed Feb. 2, 1976, Ser. No. 654,334
Int. Cl.² B60P 1/44
U.S. Cl. 214—75 T **21 Claims**



8. In a platform lift having a horizontal hinge interconnecting inner and outer platform sections for folding the unfolded sections out of a common horizontal load bearing plane into vertically extending superposed relationship of the undersides of the folded sections, a vertically elongate runner assembly to whose lower end the forward edge of the inner platform section is horizontally pivotally connected, the runner assembly being vertically movably mounted on a supporting framework, the improvement comprising;

a finite length of a flexible member having one end connected at the rear edge of the outer platform section and having another end connected to the upper end of the runner assembly;

means intermediate the inner platform section and the framework to translate vertical movement of the runner assembly on the framework into folding or unfolding movement of the inner platform section;

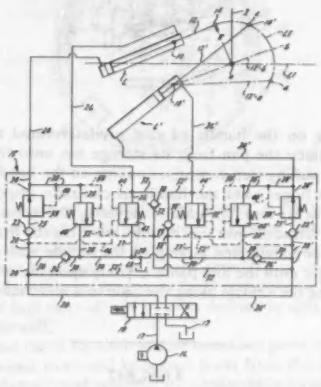
and means defining a rigid rearward extension of the inner platform section for contacting and seating an intermediate portion of said flexible member for effecting folding and unfolding movement of the outer platform section as a function of the corresponding folding or unfolding movement of the inner platform section.

4,007,845

SWING MECHANISM

David L. Worback, Highland, Mich., assignor to Massey-Ferguson Inc., Detroit, Mich.

Filed Mar. 17, 1975, Ser. No. 559,271
Int. Cl.² G02F 3/32
U.S. Cl. 214—138 D **22 Claims**



20. A hydraulic system for operating backhoe swing apparatus and the like comprising: a pair of hydraulic lines; a normally open pressure reducing valve controlling one of said hydraulic lines and operable to limit pressure in said one hydraulic line to a predetermined maximum pressure, a first normally closed, metering valve controlling said other hydraulic line and operable to permit flow of hydraulic fluid through said other hydraulic line only when a predetermined minimum pressure exists in said one hydraulic line in response to said flow in said one direction through said one hydraulic line, a second normally closed, metering valve operably to control flow of hydraulic fluid in the opposite direction through said one hydraulic line only when a pedetermined minimum pressure exists in said other hydraulic line; and check valve means for preventing flow through said pressure reducing valve in said opposite direction.

4,007,846

AUTOMATED METHODS FOR HANDLING TOTE PANS

George R. Pipes, Salt Lake City, Utah, assignor to Kenway Engineering, Incorporated, Bountiful, Utah

Continuation of Ser. No. 417,167, Nov. 19, 1973, abandoned, which is a division of Ser. No. 336,109, Feb. 26, 1973, Pat. No. 3,809,259. This application Nov. 13, 1974, Ser. No. 520,519
Int. Cl.² B65G 47/00
U.S. Cl. 214—152 **1 Claim**

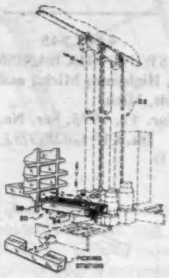
1. An automated method of moving tote pans each having an inverted U-shaped handle on the exposed end wall of the tote pan, normally stored in vertical rows of storage bins on each side of an aisle to a merchandise picking site using an automated vehicle which moves essentially axially back and forth along the aisle and comprises an operator-controlled tote pan retractor equipped with a first tote pan engaging finger and also equipped with a second tote pan-engaging finger, the steps of:

moving the vehicle along the aisle to a predetermined vertical row of storage bins;

vertically locating the operator-controlled tote pan retractor at a predetermined bin elevation;

extending the first tote pan-engaging finger of the retractor transverse of the aisle outwardly at said bin elevation;

elevating said first finger to engage the inverted U-shaped handle on the exposed end wall of the tote pan;



pulling on the handle of said predetermined tote pan to displace the pan from its storage bin onto the retractor the pulling step comprises pulling on the handle with said first finger until the handle is centrally disposed on the retractor and, thereafter, elevating the second finger of the retractor into said handle, lowering the first finger out of the handle and pulling on the handle with said second finger until the tote pan is entirely upon the retractor; and

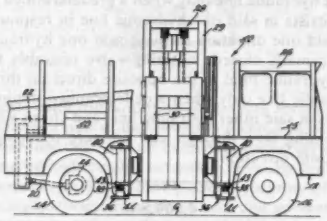
moving the vehicle along the aisle to a merchandise picking site.

4,007,847

INTERLOCK ARRANGEMENT FOR USE WITH SIDELOADER FORK LIFT TRUCK

George P. Marco, Homewood, Ill., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Oct. 30, 1975, Ser. No. 627,141
Int. Cl.² B66F 9/10
U.S. Cl. 214—670 7 Claims



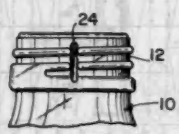
1. In combination, a sideloader vehicle having means for handling material from at least one side of the vehicle which extends lengthwise of the vehicle, means for propelling said vehicle including an engine connected to drive wheels of the vehicle through a hydraulic power shift transmission, pump means hydraulically connected to said hydraulic power shift transmission for supplying a pressurized hydraulic fluid thereto, at least one stabilizing jack mounted on said vehicle, said stabilizing jack having a piston portion movable from a ground engaging stabilizing position to a retracted nonstabilizing position in which said piston portion does not engage the ground, and interlock means comprising means effective when said pistion portion of said jack is not in a predetermined retracted position to hydraulically connect the output of said pump means to a sump, whereby to render said hydraulic power shift transmission ineffective to transmit motive power from said engine to said drive wheels.

4,007,848

ANTI-MISSILING BOTTLE STRUCTURE

William Joseph Snyder, Brockton, Pa., assignor to Zapata Industries, Inc., Frackville, Pa.

Filed May 9, 1975, Ser. No. 576,207
Int. Cl.² B65D 51/16
U.S. Cl. 215—31 27 Claims



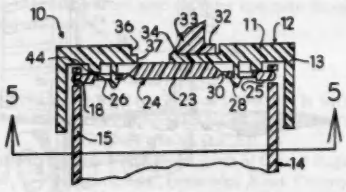
1. An improved container of the type having a neck provided externally with circumferential beads including threads for receiving a threaded cap to contain pressurized fluids, the improvement comprising means including at least one venting channel extending transversely into at least one of said beads for providing release of fluid pressure from beneath said cap sufficient to prevent missiling of the cap when the cap is initially turned to remove it from said container, the channel traversing at least one of the turns of the threads, the depth of the channel perpendicular to the surface of the container being greater than the thread depth.

4,007,849

SAFETY CONTAINER

Donald B. Hinkle, 12151 Brougham, Sterling Heights, Mich. 48077

Filed Mar. 29, 1976, Ser. No. 671,481
Int. Cl.² B65D 55/02, 85/56; A61J 1/00
U.S. Cl. 215—213 10 Claims



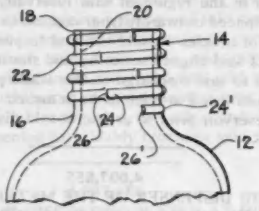
1. Improvement in a safety container for medicine having a cap and bottle, said cap constructed in relation to the bottle such that in one position thereof the cap can be lifted off the bottle and in another position thereof the cap cannot be removed from the bottle, said improvement comprising detent means associated with the cap, said detent means moveable in respect to said cap and having a lock and unlock position in respect thereto, cooperative means on the bottle capable of engaging with said detent means to lock said cap on the bottle, and manually actuable handle means on the cap capable of moving said detent means between lock and unlock positions thereof, said detent means being flexible, said handle means operative during actuation thereof upon said detent means to flex the same to move it between its lock and unlock positions.

4,007,850

SAFETY CLOSURE FOR MEDICINE BOTTLES AND THE LIKE

Eugene L. Beaugrand, 1224 Seville, Pacifica, Calif. 94044

Filed Dec. 4, 1975, Ser. No. 637,803
Int. Cl.² B65D 55/02, 85/56; A61J 1/00
U.S. Cl. 215—216 6 Claims



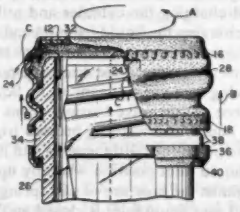
1. A safety closure for a container of the type that includes a generally cylindrical neck having a proximate end integral with the container and a distal end defining a mouth opening for communicating with the interior of the container comprising a helical thread formed on said neck and projecting therefrom and having a plurality of convolutions of uniform profile intermediate said distal end and said proximate end, said thread having a plurality of teeth formed therein throughout the length thereof, said teeth each defining an abutment residing wholly within the profile and extending transverse to the thread and facing in a direction toward said proximate end, a cap having a cylindrical body and an end plate spanning one end of said cylindrical body, said cylindrical body defining interior thereof a helical thread groove complementally engageable with the thread on said neck, a pawl secured to said cylindrical body adjacent the end thereof remote from said end plate, said pawl having a radially extending tooth surface radially movable into said groove for engagement with the abutments on said neck thread to prevent rotation of said cap toward the distal end, means for radially resiliently biasing said pawl relative to said cylindrical body and into said groove for engagement with said abutments, and means affording a grip on said pawl for moving said pawl radially outward against said biasing means to effect disengagement between said pawl and said abutments to permit substantially unimpeded removal of said cap from said neck.

4,007,851

ANTI-MISSILING BOTTLE CLOSURE

Rocco David Walker, Hazleton, Pa., assignor to Zapata Industries, Inc., Frackville, Pa.

Filed May 9, 1975, Ser. No. 576,206
Int. Cl.² B65D 51/16
U.S. Cl. 215—307 29 Claims



1. An improved closure of the type having a shell with integral top and side walls, a knurl region adjacent to the top wall, and with rolled-on threads provided on the side wall for engagement with the threaded neck of a bottle to contain pressurized fluids, the threads being limited to about 1¼ turns, the improvement comprising means including venting openings in said side wall contiguous to the knurl region for releasing the pressure within said closure sufficiently to prevent missiling of the closure when the closure is initially turned to unthread it from the bottle.

4,007,852

KNOCKOUT WINDOW MEANS

Paul D. Gernhardt, Newton, Kans., assignor to Slater Electric Inc., New York, N.Y.

Filed Oct. 20, 1975, Ser. No. 624,043
Int. Cl.² H02G 3/12
U.S. Cl. 220—3.2 13 Claims

1. In an electrical assembly box having a backwall and upstanding sidewalls defining a generally open front face at their front edges, knockout window means which comprises:

at least one knockout port formed primarily in one of said sidewalls, said port having its front end defined by a first edge of said sidewall and its sides defined by side edges of said sidewall;

a knockout panel for each of said knockout ports, generally superposed over said knockout ports from the inside of said sidewall, and adapted to substantially closeoff said knockout port, said panel dimensioned with its front edge extending slightly forward of said first edge of said sidewall and its back edge extending at least to a plane defined by the outside surface of said backwall, said panel being connected to said box only at its front and back ends such that knockout panel removal slot means which are accessible by a wedge-like tool from both inside and outside said box are formed at said front end and at said back end of said knockout panel.

4,007,853

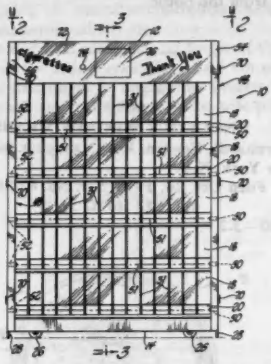
ANTI-THEFT DISPENSING RACK

Vern A. Bahneman, Detroit, Mich., assignor to Marvin Hofmann, Birmingham, Mich., a part interest

Filed Aug. 1, 1975, Ser. No. 601,236
Int. Cl.² A47F 3/024
U.S. Cl. 221—3 13 Claims

1. A dispensing rack assembly comprising: enclosure means defining a plurality of side by side compartments for storing items to be dispensed, an access opening extending across and communicating with the interior of said compartments through which items may be withdrawn, means associated with said access opening for allowing only one-at-a-time manual removal of items from each compartment through said access opening and detection means associated with said access opening for detecting the withdrawal of items from said compartments; said detection means including radiant energy emitting means for directing a beam of radiant energy across said access opening and forward of said compartments, receiving means associated with said emitting means for receiving said beam of radiant energy, and circuit means associated with said receiving means including control

means responsive to a change in the beam received by said receiving means and signal means actuatable by said control



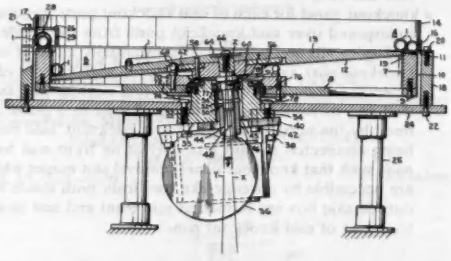
means whereby withdrawal of an item from any one of said compartments changes said beam and actuates said signal means.

4,007,854

APPARATUS FOR FEEDING ARTICLES IN SERIAL ORDER

Albert W. G. Ervine, Bridgeport, Conn., assignor to Remington Arms Company, Inc., Bridgeport, Conn.

Filed Oct. 8, 1975, Ser. No. 620,706
Int. Cl.² B65H 9/00
U.S. Cl. 221—167 **7 Claims**



1. Apparatus for feeding articles in serial order, comprising in combination:

a disc having an upper working surface which is a non-planar upwardly-convex surface of revolution symmetrical about an axis of revolution thereof;

a rim extending circumferentially about said disc and having an upper working surface which is a surface of revolution symmetrical about an axis of revolution thereof;

means supporting said disc and said rim for rotation each about its own axis of revolution, with the axis of revolution of said rim extending substantially vertically and the axis of revolution of said disc being inclined to the vertical;

the periphery of said working surface of said disc extending to at least substantially the same elevation as an adjacent region of said working surface of said rim at one fixed peripheral location constituting an article transfer station, and extending to a substantially lower elevation than an adjacent region of said working surface of said rim at another fixed peripheral location to define a reservoir for articles within said rim, said working surface of said disc being inclined at a greater slope in said reservoir than at said transfer station;

said disc and rim being constructed and arranged, upon rotation thereof, to distribute articles from said reservoir outwardly against said rim, to elevate the distributed articles from said reservoir and deliver them serially onto said rim at said transfer station, and thence to convey a series of said articles away from said transfer station on said working surface of said rim;

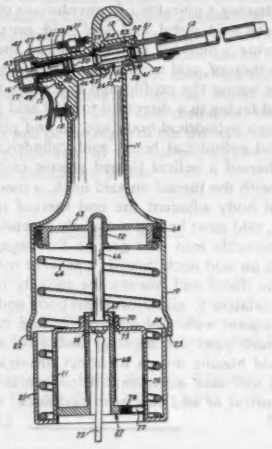
and rail means extending circumferentially about said rim and being interrupted at an article discharge station spaced circumferentially about said rim from said transfer station in the region of said reservoir, said rail means being spaced outwardly from said rim to retain an aligned series of articles on said rim and to permit free conveyance of said aligned series by said rim from said transfer station to said discharge station while permitting excess and misaligned articles to be returned from said rim to said reservoir prior to arrival at said discharge station.

4,007,855

LIQUID DISPENSER OF THE METERING TYPE

Leonard L. Hierath, Denver, and W. Kendall Holmes, Aurora, both of Colo., assignors to Joseph M. Magrath, McCook, Nebr.

Filed Mar. 24, 1975, Ser. No. 561,535
Int. Cl.² G01F 11/06
U.S. Cl. 222—26 **6 Claims**



1. In a liquid dispensing device of the type comprising a cylinder and a piston therein and means for biasing the piston toward its minimum volume position in the cylinder at one end thereof, said device having a liquid pressure inlet and a tubular discharge outlet arranged in communication with said cylinder and including a single valve means for alternatively admitting liquid to the cylinder from the inlet for overcoming said biasing means and charging the cylinder and utilizing the biasing means for discharging the liquid from the cylinder through the outlet, the improvement which comprises means for biasing the valve means toward its liquid discharge position, means for manually moving said valve means to its liquid inlet position against the force of said valve biasing means for charging said cylinder with liquid, and a spring pressed trigger mounted on said device and positioned for engaging and latching said valve means in its liquid inlet position whereby upon movement of said trigger against the pressure of said spring said valve means is released and said liquid inlet is closed and said valve means is moved to its liquid discharge position and the liquid charge in said cylinder is discharged by operation of said piston biasing means,

said improvement including an adjustable stop means mounted on the other end of said cylinder in the path of said piston for engaging said piston and limiting the movement of said piston against said piston biasing means and

for selecting the amount of liquid to be stored in and discharged from said cylinder,

said piston having a central guide shaft rigidly attached thereto and slidably mounted in said stop means for guiding the axial movement of said piston in said cylinder, and

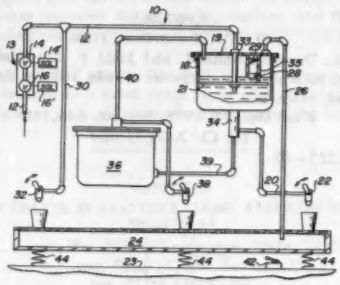
said improvement further including an end closure detachably secured to said other end of said cylinder and comprising a double walled cup opening outwardly, and having spaced inner and outer walls opening inwardly, said biasing means comprising a spring and said cup providing a seat for said spring, said spring having a portion within said walls about said inner wall, said cup having a threaded opening in its inner end and said stop means being threaded therein and comprising a tube having one end opening outwardly and the other end closed and having an opening for slidably receiving said guide shaft.

4,007,856

APPARATUS FOR DISPENSING WATER AT DIFFERENT TEMPERATURES

William V. Murphy, Philadelphia, and Charles Walter Albrecht, Warminster, both of Pa., assignors to Refreshment Machinery Incorporated, Warminster, Pa.

Filed July 23, 1975, Ser. No. 598,514
Int. Cl.² B67D *5/08*
U.S. Cl. 222—67 **10 Claims**



1. Dispensing apparatus comprising a water supply conduit for supplying water under pressure, at least one valve in said conduit, a refrigerated reservoir, said conduit being connected to said reservoir downstream from said valve, a liquid level detection means in said reservoir and connected to said valve to open and close said valve depending upon liquid level in said reservoir, a dispensing valve connected to an outlet conduit on said reservoir for dispensing cold water, an ambient supply conduit connected to said water supply conduit at a location between said at least one valve and said reservoir, a dispensing valve connected to said ambient supply conduit for dispensing water at ambient temperature, a hot water heater tank having an inlet communicating with said water supply conduit downstream from said at least one valve and by way of said reservoir, and a dispensing valve connected to an outlet on said tank for dispensing hot water.

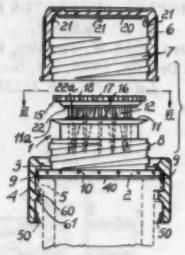
4,007,857

SAFEGUARD CAP STRUCTURE PARTICULARLY FOR BOTTLES

Umberto Tomiati, Via D. Filippini, 19, Verona, and Walter Boldrini, Via Monreale, 10, Milan, both of Italy

Filed Oct. 14, 1975, Ser. No. 621,923
Claims priority, application Italy, Apr. 10, 1975, 22236/75
Int. Cl.² B67D *5/00*
U.S. Cl. 222—153 **17 Claims**

1. A safeguard cap structure particularly for bottles, comprising a cylindrical hollow body which can be associated in sealing engagement with the neck of a bottle, a threaded portion along the outer surface of said hollow body, a plurality of flexible reeds extending longitudinally in said hollow body in the proximity of the free edge thereof, a shut off disc supported by said reeds and forming with said free edge, outlet ports for a liquid contained in said bottle, said shut off disc being adapted to abut on said free edge in contrast to the force exerted by said reeds, a covering hood which may be screwed onto said threaded portion, said cap structure being characterized in that it comprises a plurality of short and rigid appendages and a plurality of long and flexible appendages arranged



between the short ones, said appendages extending radially from the periphery of said shut off disc, projections being provided peripherally along the inner bottom of said covering hood and adapted to engage said long and substantially flexible appendages during the rotation of said covering hood.

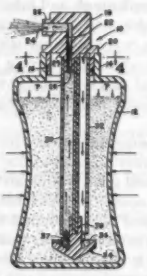
16. A safeguard cap structure according to claim 1, characterized in that said covering hood is manufactured as a single component together with said collar for assembling the cap to the neck of a bottle, the lower edge of said hood being connected to said collar by means of tear away spot bridges.

4,007,858

SQUEEZE-BOTTLE-TYPE POWDER DISPENSER

Joseph John Shay, Manchester, N.H., assignor to Summit Packaging Systems, Inc., Manchester, N.H.

Filed Feb. 17, 1976, Ser. No. 658,587
Int. Cl.² B67D *5/54;* **B05B** *11/04*
U.S. Cl. 222—193 **12 Claims**



1. A powder dispenser comprising a container adapted to contain powder and having resilient sidewalls and a dispensing head having a discharge orifice therein, first conduit means extending inside the container and communicating from the orifice to a point adjacent the lower end of the container, second conduit means extending inside the container from adjacent said point up to second point adjacent the upper end of the container, and generally horizontal baffle surface means spaced proximately below the lower end of the second conduit means, whereby squeezing the resilient walls of the container instantly pressurizes the upper end of the container to drive air down the second conduit means to mix with powder immediately above the baffle surface means and fluidize the powder,

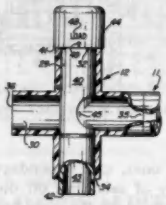
moving the air-powder mixture into and through the first conduit means and out the orifice, the squeezing of the walls moving powder inward toward the baffle and reducing the cross section of the container and driving upward the level of powder to increase the hydrostatic pressure of the powder at the first point and forcing a portion of the air down through the powder to urge powder between the baffle and the lower end of the second conduit.

4,007,859

AUXILIARY HOPPER APPARATUS FOR RELOADING PRESS

Stanley A. Dandrea, 3735 W. Townley, Phoenix, Ariz. 85021

Filed Dec. 24, 1975, Ser. No. 644,192
Int. Cl.² G01F *11/28*
U.S. Cl. 222—443 **2 Claims**



1. An auxiliary hopper apparatus for holding a reserve quantity of granular ammunition reloading material and for selectively providing a continuous supply of said material to the primary hopper of the reloading press, said auxiliary hopper apparatus comprising:

a. a receptacle for holding a quantity of said granular material and having a gravity flow discharge port proximate the bottom thereof;

b. a delivery conduit having opposite inlet and outlet ends, said inlet end communicating with said discharge port and said conduit extending downwardly therefrom to said outlet end; and

c. valve means associated with said delivery conduit at said outlet end, said valve means including:

i. a body having a first elongate bore therethrough and a second elongate bore having inlet and outlet ends and extending therethrough and intersecting said first bore,

ii. a spool rotatably and slidably carried within said first bore having a body member with a longitudinal bore extending therethrough having an open end and a closed end, and said body member defining an aperture extending radially from said longitudinal bore through said member,

iii. said spool being selectively movable to a first open position wherein said aperture is aligned with said second bore and directed toward said inlet end thereof for providing communication between said inlet of said second bore and said open end of said spool; a second open position rotatable from said first position wherein said aperture is aligned such that said inlet end of said second bore communicates with said outlet end of said second bore and a closed position placing said aperture at a location remote from said second bore thereby selectively and operatively controlling the flow of granular material.

4,007,860

METHOD AND APPARATUS FOR MAKING BOWS

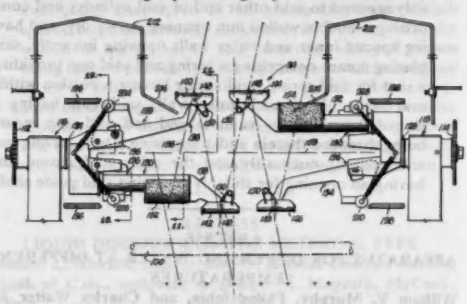
Herbert C. Glesmann, Omaha, Nebr., assignor to Ward Paper Box Company, Kansas City, Kans.

Filed Dec. 15, 1975, Ser. No. 640,898
Int. Cl.² A41H *43/00*
U.S. Cl. 223—46 **30 Claims**

1. Apparatus for making a ribbon bow comprising:

a ribbon feeder assembly;

winding mechanism for receiving a length of ribbon from the feeder assembly and winding said length of ribbon into an extended helix, said winding mechanism including a plurality of simultaneously rotatable arms for receiving said length of ribbon from the feeder assembly, each of said arms having a pad swingably mounted thereon,



an assembly for gathering said extended helix of ribbon at substantially the horizontal center thereof whereby to define the loops of said bow; and

means for securing said loops at their point of gathering whereby to create the finished bow.

4,007,861

HANGER CONNECTOR

Everett L. Duester, Holland, and Judd F. Garrison, Grand Rapids, both of Mich., assignors to John Thomas Batts, Inc., Zeeland, Mich.

Filed Dec. 24, 1975, Ser. No. 644,118
Int. Cl.² A47J *51/084*
U.S. Cl. 223—85 **3 Claims**

1. A detachable and reusable device for supporting one hook suspended garment hanger from another in a vertically spaced relationship, comprising:

an elongated strip of flexible sheet-like plastic material having tension sustaining characteristics, said strip including an opening adjacent one end defined by a slit extending transversely and longitudinally of said strip for receiving the hook of an upper hanger, said strip further including a pair of spaced parallel slits defining a strap spaced from the lateral edges of the strip and from the other end thereof for forming an attachment for the hook of a lower hanger, the lower, terminal portion of each said spaced slits extending outwardly and upwardly in a hook-like shape.

4,007,862

CAR RACK FOR HOLDING SURFBOARDS OR THE LIKE

Rex Walter Heftmann, Pacific Beach, Calif., assignor to Rax Works, Inc., Encinitas, Calif.

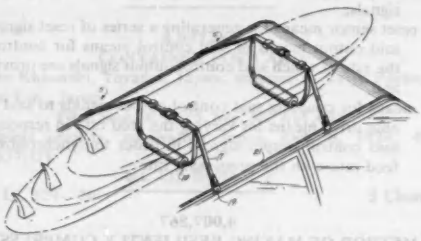
Filed Mar. 13, 1975, Ser. No. 557,940
Int. Cl.² B60R *11/00*
U.S. Cl. 224—42.1 B **10 Claims**

1. An accessory detachably securable on a mounting surface of a car in spaced relationship with an identical accessory to form a rack for supporting an elongated object such as a surfboard, the accessory comprising:

an elongated support pad to be disposed between the object and the mounting surface, the support pad being compressible so as to preclude marring the finish on the mounting surface or object;

a frame member;

strap means for tautly spanning the mounting surface and including first and second lengths of strap extending from opposite ends of the support pad to slidably pass through the frame member and fold back to extend away there-



from to opposite remote ends of the strap means, said first and second lengths cooperating with the support pad and with the frame member to form a loop that is adjustable to tightly gird the object and secure the object in a fixed position between the mounting surface and the frame member when the strap means tautly spans the mounting surface; and

separate anchor means attached to each remote end for connection to a fixed point at an edge of the mounting surface so as to maintain the tightness of the loop.

4,007,863

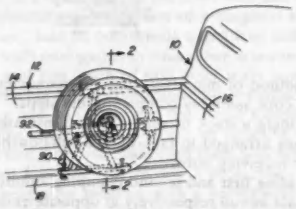
PICKUP TRUCK SPARE TIRE, JACK AND LUG WRENCH HOLDER

Oscar L. Norris, Rte. No. 1, Bennington, Okla. 74723

Filed Aug. 5, 1975, Ser. No. 603,374

Int. Cl.² B62D *43/08*

U.S. Cl. 224—42.24 **10 Claims**



1. A spare tire bracket assembly comprising an upright frame including upper and lower portions, said lower portion including widely spaced opposite end portions, said upper portion including a central uppermost portion, said opposite end portions including widely spaced depending foot portions adapted to rest upon spaced marginal portions of the flooring of a pickup truck load bed, said central uppermost portion including an upwardly projecting abutment adapted to be engaged under the upper inwardly projecting ledge of a side wall of said load bed extending along said marginal portions for anchoring said bracket in said load bed, a vertical mid-portion of said frame including lockable clamp means adapted to clamp a vehicle wheel and tire against one side of said frame and means defining a horizontal recess which opens outwardly of said one side of said frame for receiving an elongated jack member therein, said clamp means being operative to clamp said tire against the opposite ends of said jack member to hold the latter, as well as said tire, tightly in position relative to said bracket assembly.

4,007,864

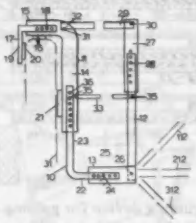
CARRIER FOR AUTOMOBILE

Emanuel Hreha, 348 E. 27th St., Erie, Pa. 16504

Filed Mar. 5, 1975, Ser. No. 555,371

Int. Cl.² B60R *9/02*

U.S. Cl. 224—42.46 R **4 Claims**



1. A carrier for an automobile comprising,

a generally z-shaped first side member and a second side member,

means supporting said second side member on said first side member providing a generally U-shaped space therebetween,

said first side member having an intermediate member and a first end member and a second end member,

said first end member being fixed to said intermediate member at the upper end thereof and extending therefrom generally perpendicular thereto,

said second end member being fixed to said intermediate member at the end thereof opposite said first end member and extending therefrom in a direction opposite said first end member,

said second side member being supported on the end of said second end member at the end thereof remote from said intermediate member,

the upper end of said second side member having means securing it to said first side member,

said second side member being pivotally supported on said second end of said second end member,

said second end member comprising an intermediate member fixed to said second end member providing adjusting means for adjusting the space between said second side member and said first side member,

said first side member comprising means for adjusting the length of said first side member,

said first side member comprising a first L-shaped member,

said first L-shaped member having one leg that is adapted to extend downwardly inside the door of an automobile,

a second leg of said first L-shaped member being adapted to overlie the upper edge of said door,

said second end member comprising a second L-shaped member,

said second L-shaped member having a first leg adjustably secured to said intermediate leg of said Z-shaped member,

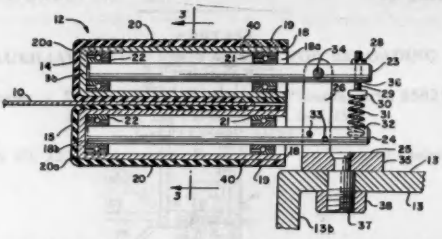
a second leg extending perpendicular to said intermediate leg of said L-shaped member, and

said second L-shaped member having spaced holes therein adapted to receive a fastening means for adjustably securing said L-shaped member to said intermediate leg of said first side member and to means for adjusting the width of the space between said first side member and said second side member.

4,007,865
WEB GUIDING AND CENTERING APPARATUS

Nelson B. Crandall, Edenton, N.C., assignor to Cape Colony Manufacturing, Inc., Edenton, N.C., a part interest

Continuation-in-part of Ser. No. 512,302, Oct. 4, 1974, abandoned. This application Aug. 27, 1975, Ser. No. 608,205
Int. Cl.² B65H 25/26
U.S. Cl. 226—17 25 Claims

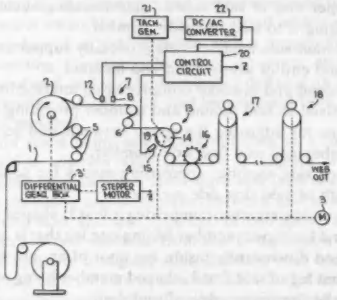


1. In a web guiding device for guiding a moving web, a pair of co-acting rolls for engaging an edge portion of the web on its opposite faces, adjustable means for mounting said pair of co-acting rolls in engagement with the edge of a moving web at a predetermined angle to and at a predetermined distance from a selected center line for the moving web, means supporting one of said rolls for rotation about a fixed axis, means pivotally supporting the other of said rolls to swing in a single plane normal to the web and common to both rolls toward and away from said one roll, resilient means for biasing said pivotally supported roll to swing toward said one roll, at least one of said rolls having cylindrical inboard and outboard roll portions, said inboard roll portion being relatively soft and of a high coefficient of friction, said outboard roll portion being relatively hard and of a low coefficient of friction.

4,007,866
WEB TRANSPORT ARRANGEMENT

John E. Traise, Lewiston, N.Y., assignor to Moore Business Forms, Inc., Niagara Falls, N.Y.

Filed July 11, 1975, Ser. No. 595,062
Int. Cl.² B65H 23/18
U.S. Cl. 226—31 12 Claims



1. A web transport arrangement for transporting a web material along a web path, the arrangement comprising in combination:

variable drive means for supplying a web material from a feed area to the web path and maintaining the web under a low tension while passing through the feed area;

first sensor means arranged in operative relationship with the low tension area for providing a first series of signals dependent upon the feed rate of the web material through the low tension area;

processing means for processing the web material in a processing area and maintaining the web material under a high tension while passing through the processing area;

a second sensor means arranged along the web material path at a position within the processing area for providing a second series of signals dependent upon the processing rate of said processing means;

control means incuding comparison means for comparing said first and second series of signals and providing at its output a first series of control signals when signals of one of said first and second series of signals precedes the other and output means for providing a series of control output signals in response to said first series of control signals;

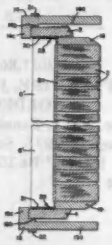
reset sensor means for generating a series of reset signals to said output means of said control means for controlling the rate at which said control output signals are provided; and,

means for coupling said control output signals to said variable drive means for varying the feed rate in response to said control output signals in order to synchronize the feed rate with the processing rate.

4,007,867
METHOD OF MAKING RESILIENTLY COMPRESSED LAMINATED CORE FOR A DYNAMOELECTRIC MACHINE

Warren Pierce Wielt, and Luis Alberto Estrada, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 503,269, Sept. 5, 1974, Pat. No. 3,940,648. This application Nov. 12, 1975, Ser. No. 631,295
Int. Cl.² H02K 15/02; B23K 19/00
U.S. Cl. 228—179 7 Claims



1. A method of manufacturing a dynamoelectric machine magnetic core assembly comprising the steps:

1. providing a stack of generally flat, insulated metal laminations arranged in face-to-face relationship to define a rotor-receiving bore,

2. providing first and second clamping annuli and positioning said annuli respectively at opposite ends of said stack with an inner portion of each annulus over the stack and an outer portion of each annulus extending radially outward from the stack,

3. providing a pair of stepped rings and accurately positioning said rings with their respective inner diameters in alignment with the inner diameter of the laminations defining said bore, each of said rings being provided with a base surface portion and first and second annular steps disposed radially outward from the base portion with the step lands facing said annuli,

4. positioning the periphery of each annulus against the rise of the second step on the ring abutting it, thereby to also position the axially outer surface of each annulus on the land of the first step of the ring abutting it,

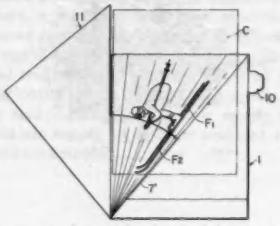
5. applying and holding an axial compressive force to the axially outer surfaces of said rings, thereby to compress said stack of laminations and deflect said respective inner portions of the annuli axially outward into the space defined by the rise of the first step and the base portion of the ring abutting it,

6. providing a plurality of elongated bars, and positioning said bars between said annuli with the longitudinal axes of the bars substantially parallel to the longitudinal axis of said stack, and with the ends of said bars respectively adjacent said annuli,
7. welding the respective ends of each bar to the adjacent annuli thereby to rigidly fix the spacing between the outer portions of said annuli,
8. releasing the axial compressive force applied to said rings, and removing said rings.

4,007,868
CONTAINER FOR CARD

Yukio Kusunoki, Toyama, Japan, assignor to Taiyo Package Co. Ltd., Japan

Filed Sept. 8, 1975, Ser. No. 611,432
Claims priority, application Japan, Oct. 8, 1974, 49-121637[U]
Int. Cl.² B65D *5/38*
U.S. Cl. 229—20 **3 Claims**



1. A container for card which comprises a container body and a lid in combination, said container body comprising an end wall, first and second inner walls and a bottom flap of the first inner wall, said end wall being folded inwardly along a fold line, the second inner wall being folded inwardly along a central fold line and being connected to a back side of said end wall, and said first and second inner walls each being provided with a linear slit, each said slit extending obliquely from a corner in a lower part of the inner wall and being of a length approximately one half that of a diagonal line drawn from that corner, said lid comprising a first free end, first and second inner walls contiguous to each other, a second free end and an outer end flap, each of said inner walls comprising a projection and a lug at spaced portions thereof adjacent to the associated free end, the outer end flap being folded inwardly along a fold line and being connected by adhesive to an end portion of the first inner wall, said each inner wall being folded along a central fold line and having a projection, a curved edge and a linear edge meeting with a corresponding linear edge at the top of the central fold line, said container body and said lid being combined in use with each curved edge of the lid being inserted into each linear slit of the container body, such that each curved edge of the lid may slide over a terminating point of the linear slit so that, when the lid is opened the associated projection is rotated with the lug functioning as a fulcrum and so that during said rotation said projection engages the terminating point so as to prevent further rotation.

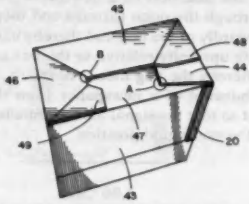
4,007,869
CORRUGATED CARTON CONSTRUCTIONS

Walter J. Stolkin, Chicago, and Alan M. Sax, Arlington Heights, both of Ill., assignors to Stolmar Corporation, Chicago, Ill.

Filed Jan. 14, 1976, Ser. No. 648,886
Int. Cl.² B65D *5/08, 5/10*
U.S. Cl. 229—41 B **10 Claims**

1. In a corrugated container of the type having a bottom which automatically deploys to a locked configuration upon opening said container, said container being formed from a blank having four side panels and four bottom panels depending downwardly from said side panels, the improvement comprising:

at least one pressure flap located on one of said bottom panels for engaging and pressing against an adjacent bottom panel during opening and closing of said container to oppose said opening and closing whereby the container is opened by manual application of sufficient pressure to overcome the force of said pressure flap and will thereafter remain in the open position without tending to collapse due to the force of said pressure flap opposing such collapse,



and wherein one of said bottom panels overlaps an opposite bottom panel, said pressure flap being located on one of the remaining two bottom panels, said blank further including:

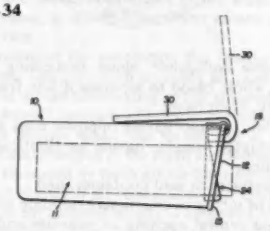
a relief flap located on the other of said remaining panels, said relief flap being dimensioned, relative to said pressure flap, to permit said opposite bottom panel to deploy prior to said overlapping bottom panel,

whereby the overlapping and the opposite bottom panels are prevented from bridging during movement to the open position.

4,007,870
NEWSPAPER DELIVERY BOX SIGNAL

John L. Hankis, Greenville, Mich., assignor to Roy A. Hankis, Troy, Mich.

Filed Dec. 3, 1975, Ser. No. 637,366
Int. Cl.² A47G *29/12*
U.S. Cl. 232—34 **7 Claims**



1. In a newspaper delivery box signal for mounting within a horizontally elongated, roughly tubular shaped box having an open forward end to receive a newspaper and the like, comprising: a flap sized to fit within said box and biased for normally being generally vertical for thereby blocking the box open end; a horizontally arranged U-shaped clamp for receiving and resiliently clamping to the upper, central edge portion of the box forward end for removable attachment thereto, and so that one leg of the clamp is thereby arranged within the box; hinge means connecting said clamp to the flap, whereby the flap may pivot inwardly and upwardly relative to the box forward end; and an elongated signal flag means, said signal flag means extending upwardly and then rearwardly of the box so that a major portion of the flag means is normally arranged above and roughly parallel to the upper surface of the box; the improvement comprising:

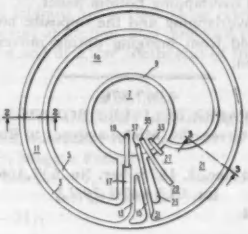
said clamp being positioned vertically above said flap;
said hinge means being positioned intermediate said clamp and said flap and being permanently attached to both said clamp and said flap; and
connection means vertically beneath both said clamp and said hinge means for securing said signal means to said flap so that said signal flag means aids in biasing said flap generally vertically,
said connection means including a stud portion formed integral with said flap near the upper end portion thereof, and a socket formed in one end of said flag means for receiving said stud, and means for locking the stud within the socket;
whereby the insertion of a newspaper or the like into the box through the open forward end thereof will pivot the flap inwardly of the box and thereby cause the flag means to swing upwardly relative to the box to a signal position and whereby the flag means normally, in the absence of or withdrawal of a newspaper from the box, will hang upright so that the signal means remains roughly horizontal in the non-signal position.

4,007,871

CENTRIFUGE FLUID CONTAINER

Alan Lytton Jones, and Robert Melroy Kellogg, both of Endwell, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 13, 1975, Ser. No. 631,546
Int. Cl.² B04B *15/06*
U.S. Cl. 233—27 **4 Claims**



1. A flexible collapsible blood processing container for centrifuging whole blood to separate it into fractions according to density, comprising,
an outer fluid channel having opposite ends and comprising an interrupted annulus having an elliptical cross section when filled,
a central opening in said container, and
a plurality of tubing connections extending radially outward from said central opening to opposite ends of said fluid channel, the openings of said tubing connections in said channel having different radial distances from said central opening.

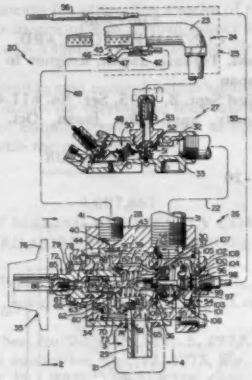
4,007,872

FUEL CONTROL SYSTEM AND CONTROL DEVICE THEREFOR OR THE LIKE

Charles D. Branson, and Roy C. Demi, both of Greensburg, Pa., assignors to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 530,605, Dec. 9, 1974, Published Application No. B530,605, and a continuation-in-part of Ser. No. 443,783, Feb. 19, 1974, abandoned, which is a continuation-in-part of Ser. No. 380,389, July 18, 1973, abandoned. This application Apr. 23, 1975, Ser. No. 570,863
Int. Cl.² F16K *31/143, 31/363*
U.S. Cl. 236—15 A **23 Claims**

1. In a fuel control system for a fuel burning apparatus or the like having a source of fuel adapted to be interconnected by passage defining means to burner means of said apparatus, a pair of control devices disposed in said passage defining means in series relation and respectively having poppet valve means for opening and closing said passage defining means, said poppet valve means of one of said control devices being a main directly manually operated on-off valve means for said system, said one control device having a thermostatically operated valve means for controlling the flow of fuel through said passage defining means intermediate said poppet valve



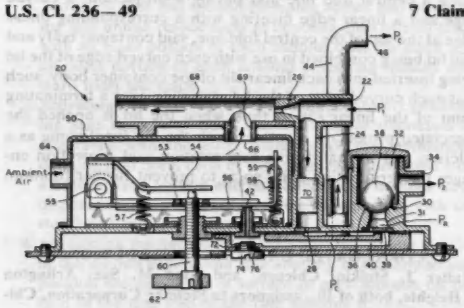
means, said one control device having a selector means operatively interconnected to said main poppet valve means and said thermostatically operated valve means to operate the same, the improvement wherein said selector means comprises a rotatable shaft having a longitudinal axis of rotation, said main poppet valve means being opened and closed by said shaft in a direction of movement substantially transverse to said longitudinal axis, said thermostatically operated valve means being moved in a direction of movement substantially the same as the direction of said longitudinal axis.

4,007,873

PNEUMATIC THERMOSTAT

Ernest J. Duchek, Mount Prospect, Ill., assignor to Powers Regulator Company, Skokie, Ill.

Continuation-in-part of Ser. No. 472,337, May 22, 1974, abandoned. This application Apr. 9, 1975, Ser. No. 566,387
Int. Cl.² F24F *11/02*
U.S. Cl. 236—49 **7 Claims**



1. In an air flow distribution apparatus having a means for supplying pressurized air, a means for diffusing said air into an enclosed area, and a means for regulating the air flow to said diffusing means from said supply means in response to an air pressure signal indicative of temperature within the enclosed

area, the improvement comprising: a pneumatic thermostat capable of generating from a variable pressure air supply said air pressure signal indicative of ambient temperature, said thermostat including a pressure reducing chamber having a lower and an upper section; said lower section adapted to receive from said air flow distribution apparatus upstream from said regulating means said variable pressure air supply and said upper section having a first outlet port in communication with the air flow distribution apparatus downstream from said regulating means; means for intermittently bleeding said lower section to said upper section to produce a constant pressure within said lower section; restriction nozzle adapted to continuously bleed from said lower section to a pressure transmitting chamber a substantially constant pressure air flow, said pressure transmitting chamber communicating with an exhaust nozzle which vents to a thermometric chamber, said thermometric chamber having an inlet port to receive ambient air from the enclosed area and a second outlet port; means disposed within said thermometric chamber and adjacent said exhaust nozzle for variably inhibiting the air flow from said exhaust nozzle automatically in response to changes in ambient temperature thereby producing a pressure within said pressure transmitting chamber indicative of said ambient temperature, a third air outlet port in communication with said pressure transmitting chamber to thereby transmit said pressure signal to said regulating means; and means for aspirating said thermometric chamber disposed adjacent to said second air outlet port, said aspirating means in communication with said variable pressure air supply and adapted to utilize said air supply to aspirate ambient air through said thermometric chamber.

4,007,874

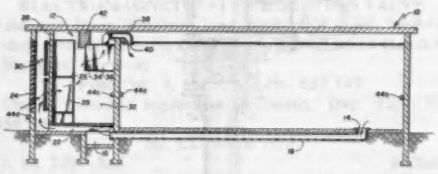
HEATING SYSTEM

Wilbert Laudner, Rockwell, Iowa 50469

Filed Aug. 14, 1975, Ser. No. 604,797

Int. Cl.² G05D *23/00*

U.S. Cl. 237—2 B **10 Claims**



1. A building heating system for buildings containing freezers comprising: A compressor housing for the freezers, external to the area to be heated; means within the area to be heated for collecting cold building air and conveying the cold air to said compressor housing; means operably secured to said compressor housing for selectively adding supplemental cold make-up air to the cold building air; means operably secured in proximity to the compressors for forcing the cold air through the compressors; means for selectively cooling said compressor housing; means operably secured to said compressor housing for conveying heated air out of said compressor housing into the building; means operably secured to said compressor housing for selectively adding supplemental heat to the heated air; and control operably secured to said supplemental cold make-up air means, to said means for selectively cooling said compressor housing, and to said means for adding supplemental heat to the heated air means for controlling the heating system.

4,007,875

INSTALLATION FOR VENTING THE INTERIOR SPACE OF A MOTOR VEHICLE

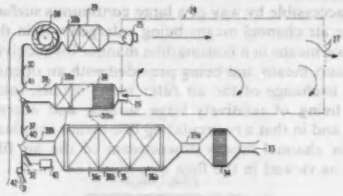
Albert Stolz, Tubingen, Germany, and Axel Stehle, Nanuet, N.Y., assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Apr. 3, 1975, Ser. No. 564,920

Claims priority, application Germany, Apr. 6, 1974, 2416805

Int. Cl.² B60H *1/02*

U.S. Cl. 237—12.3 A **44 Claims**



1. An installation for ventilating the interior space of a passenger motor vehicle which includes air inlet and air discharge aperture means terminating in the atmosphere, at least one fresh air channel means leading from the air inlet aperture means into the interior space, fan means and at least one air filter insert means arranged in the fresh air channel means and adapted to be traversed by fresh air for filtering at least one of mechanical and chemical air contaminations, characterized in that at least one air channel means is extended along a space means accessible by way of a large continuous surface means, said one air channel means being enlarged within the area of this space means in a housing-like manner for receiving the air filter insert means and being provided with an opening means for the exchange of the air filter insert means, said opening means being of relatively large surface and adapted to be closed, a heat-exchanger for preheating the fresh air in the fresh air channel means is arranged upstream of the air filter insert means, as viewed in the flow direction, and in that a recirculating line means terminates in the fresh air channel means downstream of the air filter insert means, as viewed in the flow direction.

20. An installation for ventilating the interior space of a passenger motor vehicle which includes air inlet and air discharge aperture means terminating in the atmosphere, at least one fresh air channel means leading from the air inlet aperture means into the interior space, fan means and at least one air filter insert means arranged in the fresh air channel means and adapted to be traversed by fresh air for filtering at least one of mechanical and chemical air contaminations, characterized in that at least one air channel means is extended along a space means accessible by way of a large continuous surface means, said one air channel means being enlarged within the area of this space means in a housing-like manner for receiving the air filter insert means and being provided with an opening means for the exchange of the air filter insert means, said opening means being of relatively large surface and adapted to be closed, a heat-exchanger for preheating the fresh air in the fresh air channel means is arranged upstream of the air filter insert means, as viewed in the flow direction, a recirculating line means has a first end terminating in the fresh air channel means, with a second end thereof communicating with the vehicle interior space, interchangeable means for a moisture removal are arranged in the recirculating line means and are traversed by the recirculating air, a variable throttle means at least partly closing the flow cross-section is provided at least in one of the two channel means consisting of the fresh air channel means and of the recirculating line means, a by-pass channel means by-passing the air filter insert means and terminating directly in the atmosphere, terminates in the fresh air channel means downstream of the air filter insert means as

viewed in the flow direction, a further throttling means for partly closing the flow cross-section and enabling a shifting of the main flow is arranged within the area of a discharge of the by-pass channel means in the fresh air channel means.

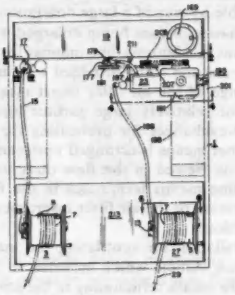
22. An installation for ventilating the interior space of a passenger motor vehicle which includes air inlet and air discharge aperture means terminating in the atmosphere, at least one fresh air channel means leading from the air inlet aperture means into the interior space, fan means and at least one air filter insert means arranged in the fresh air channel means and adapted to be traversed by fresh air for filtering at least one of mechanical and chemical air contaminations, characterized in that at least one air channel means is extended along a space means accessible by way of a large continuous surface means, said one air channel means being enlarged within the area of this space means in a housing-like manner for receiving the air filter insert means and being provided with an opening means for the exchange of the air filter insert means, said opening means being of relatively large surface and adapted to be closed, and in that a recirculating line means terminates in the fresh air channel means downstream of the air filter insert means, as viewed in the flow direction.

4,007,876

SPRAY EQUIPMENT AND METHOD

James S. Stevenson, 4230 St. Andrews Road, Oakland, Calif. 94605

Division of Ser. No. 315,295, Dec. 15, 1972, Pat. No. 3,856,274. This application Oct. 10, 1974, Ser. No. 513,747
Int. Cl.² B05B *7/30*; B67D *5/08*, *5/56*
U.S. Cl. 239—10 **10 Claims**



1. Spray equipment comprising a hose having one end available for connection to the discharge end of a spigot, a tank, means flow coupling the other end of said hose, to said tank, a second hose means flow coupling said second hose, at one end, to said tank, said second hose terminating at its other end for discharge, a source of spray ingredient at substantially atmospheric pressure, and means responsive substantially proportionally to flow velocity of liquid through said first hose to said tank, for introducing into said first hose for flow with said liquid to said tank, a flow of said ingredient.

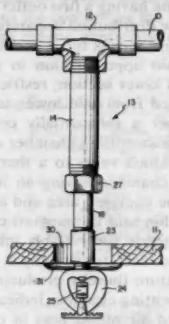
4,007,877

ADJUSTABLE STEM SPRINKLER DROP

Jimmy Jackson, Macon, and William D. Roquemore, Musella, both of Ga., assignors to James C. Hays, Macon, Ga., a part interest

Filed May 18, 1976, Ser. No. 687,487
Int. Cl.² B05B *15/08*; A62C *37/10*; F16L *27/12*
U.S. Cl. 239—209 **5 Claims**

1. An adjustable stem sprinkler drop for a fire protection sprinkler system comprising sleeve means connected at one end to a source of water under pressure, said sleeve means having a bore with an internally threaded reduced portion intermediate its ends, an elongated adjustable stem having external threads at one end threadedly engaging said reduced portion of said sleeve means, the other end of said stem being positioned below the other end of said sleeve means, the external surface of said stem being spaced from the internal bore of said sleeve means, cap means threadedly mounted on said other end of said sleeve means, and a circular gasket



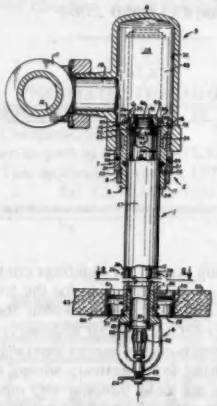
having a generally triangular cross-section carried by said cap means, said gasket having an inner diameter of a size to slidably receive the external surface of said adjustable stem, whereby said cap means is screwed onto said sleeve means so that said gasket forms a seal to prevent the passage of water under pressure but which permits rotation of said adjustable stem relative to said sleeve means.

4,007,878

ADJUSTABLE DRY PENDANT SPRINKLER HEAD ASSEMBLY

James R. Anderson, Berwyn, Pa., assignor to Central Sprinkler Corporation, Lansdale, Pa.

Filed Aug. 19, 1976, Ser. No. 716,065
Int. Cl.² B05B *15/08*; A62C *37/10*; F16L *15/02*
U.S. Cl. 239—209 **20 Claims**



1. A vertically adjustable drop nipple comprising:
a. a nipple,
b. a collet through which said nipple is inserted axially and which has an externally tapered section thereon,
c. a collet holder having an internally tapered section therein and into which said collet is inserted, said externally and internally tapered sections being in confronting abutment against each other, and
d. tightening means whereby said collet is thrust axially within said holder and is thereby compressed for gripping

said nipple and securing it from axial movement within said holder.

4,007,879

TEXTURE APPLICATOR

Elvin R. Jensen, 953 E. Howard, Pasadena, Calif. 91104

Filed Nov. 5, 1975, Ser. No. 628,986

Int. Cl.² B05B 3/00

U.S. Cl. 239—214 9 Claims

1. A texture applicator for applying a flowable texture material and comprising:

a tubular handle formed with an elongated chamber for receipt of said flowable texture material and defining first and second ends;

an end wall on said first end;

hollow, open-ended flex members projecting on their respective one ends through said end wall and projecting coextensively from said handle to define whip tubes; and

a removable closure mounted on said handle and normally closing said second end whereby said closure may be removed, said flowable texture material inserted in said tubular handle, said closure replaced and said applicator manipulated about to pivot said one end rapidly downwardly to an abrupt stop to force said material under its own momentum in small flow streams into the free extremities of said whip tubes so said whip tubes may be drawn to one side from their normal position and released to snap back past their normal position to whip said flex material from said flow streams in separated droplets to be applied in a random pattern to a surface to be textured.

4,007,880

ELECTROMAGNETIC FUEL INJECTION VALVE

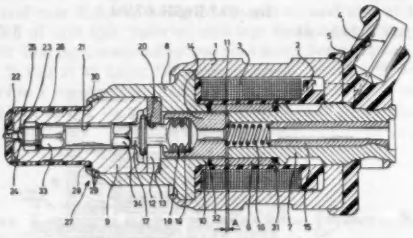
Waldemar Hans, Bamberg, and Herbert Wagner, Mellrichstadt, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Dec. 3, 1975, Ser. No. 637,147

Claims priority, application Germany, Dec. 12, 1974, 2458728

Int. Cl.² B05B 1/30

U.S. Cl. 239—585 4 Claims



1. In an electromagnetic fuel injection valve for timed low-pressure fuel injection systems, which valve includes a coaxial assembly of a connection tube, a bushing, a housing extension and a fuel nozzle body, said assembly forming a substantially cylindrical passage for fuel to be delivered by said valve to an engine, the improvement comprising metallic seals between adjacent portions of said connection tube and said bushing, and between said bushing and said housing extension, said metallic seals having their surfaces in engagement with their corresponding adjacent elements under pressure, and a further metallic seal between said housing extension and said nozzle body, said further metallic seal being formed by parallel edges on said nozzle body which mate with an interior portion of said housing extension, and under external pressure embed themselves into the wall defining the interior portion of said housing extension.

4,007,881

COIL WINDING MACHINE

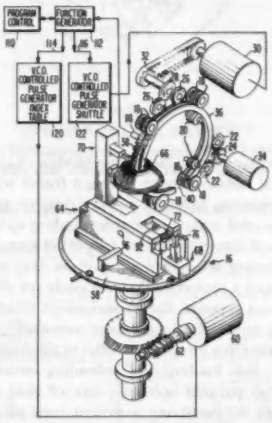
Horst Eugen Haslau, and William Emerson Rigsbee, both of Indianapolis, Ind., assignors to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 278,351, Aug. 7, 1972, abandoned. This application Sept. 6, 1974, Ser. No. 503,681

Claims priority, application United Kingdom, Feb. 22, 1972, 8214/72

Int. Cl.² H01F 41/08

U.S. Cl. 242—4 B 4 Claims



1. In a winding machine for winding a toroidal coil about a hollow core the combination comprising:

a rotatably mounted floating annular magazine for storing filament to be wound into said coil and arranged to be linked with said core,

a rotatably mounted annular shuttle arranged to be linked with said core for withdrawing the filament from said magazine and for guiding the filament on to said core, the withdrawing of said filament rotating said magazine,

rotation restraining means coupled to said magazine for inhibiting the rotation of said magazine during said withdrawing, and

shuttle drive means including an electric motor and preprogrammed motor energizing means coupled to said motor for causing said motor to rotate the shuttle at an angular rate which varies in each rotation of the shuttle in accordance with the angular position of the shuttle to withdraw the filament from the magazine at a constant rate.

4,007,882

APPARATUS FOR THE AUTOMATIC DOFFING OF TEXTILE MACHINES SUCH AS WINDING MACHINES

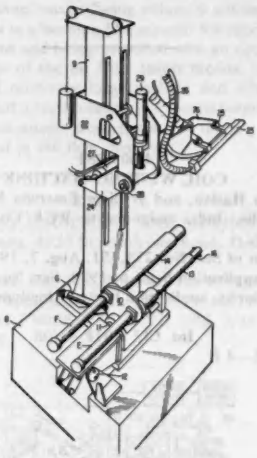
Bernard Isoard, Ecully, France, assignor to Rhone-Poulenc-Textile, Paris, France

Filed Apr. 10, 1975, Ser. No. 566,811

Claims priority, application France, Apr. 11, 1974, 74.13119; Aug. 18, 1974, 74.28648

Int. Cl.² B65H 54/02

U.S. Cl. 242—18 R 21 Claims



1. In an apparatus for automatic bobbin changing on a high speed frontal bobbin winder having a frame with at least one winding-up station, at least one yarn support gripping spindle with a horizontal axis, a rotatable winding cylinder mounted for movement into and out of tangential engagement with a package forming on a yarn support on said spindle, a fixed yarn guide and a reciprocable yarn guide for distributing yarn along the yarn support, the improvement which comprises

a loading and unloading means mounted on a frame for movement in a directon parallel to the front of the bobbin winder, said loading and unloading means including at least two parallel spindles, one of said spindles being provided for removing a wound yarn package from the yarn support gripping spindle and another of said spindles being provided for placing an empty yarn support on said gripping spindle, said parallel spindles being movable in turn into an aligned position in axial alignment with a yarn support gripping spindle of said frame;

nozzle means for capturing and removing the yarn fed to the yarn support, said nozzle means having a rectilinear capture slit communicating with a channel through which a stream of fluid may be fed at high speed and means for cutting the yarn mounted at the bottom of said slit;

means on said frame for mounting the nozzle means parallel to the axis of said winding cylinder so that it is movable between a capture position in which the slit extends in a plane including the reciprocating yarn between the fixed guide and the reciprocable guide, to capture a yarn as it moves from the fixed guide to the reciprocable guide and a second position adjacent said aligned position, to engage the captured yarn on an empty yarn support carried by said gripping spindle.

4,007,883

SIMULTANEOUS BOBBIN WINDING STATION

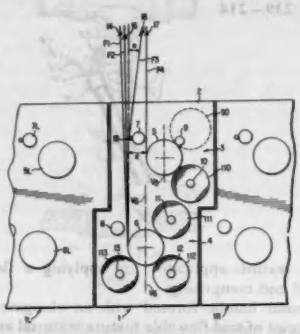
Bernard Isoard, Ecully, France, assignor to Rhone-Poulenc-Textile, Paris, France

Filed Dec. 8, 1975, Ser. No. 638,445

Claims priority, application France, Dec. 9, 1974, 74.40872

Int. Cl.² B65H 54/20

U.S. Cl. 242—35.5 R 6 Claims



1. A winding station for simultaneously winding a plurality of bobbins including a pair of vertically staggered winding units each winding unit including

a pilot roller,

bobbin mounting means and a reciprocating yarn distributor, the yarn distributor of each winding unit being positioned in an upper quadrant zone to guide yarn along a vertical plane tangential to the pilot roller, the bobbin mounting means of each winding unit including

a pair of bobbin mounts adjacent their respective pilot roller and positioned in the upper and lower quadrant zones opposite from the side on which their respective yarn distributor is positioned, the bobbin mounting means of the lower of said winding units including

a third bobbin mount in the quadrant zone underlying its respective yarn distributor,

means for feeding a pair of yarns to each winding unit, and

means for diverting one of the pair of yarns from the upper of said winding units to the lower winding unit.

4,007,884

WINDING APPARATUS

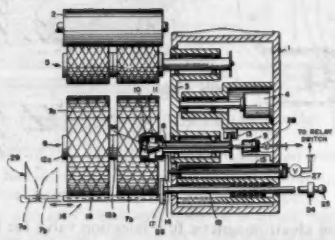
Heinz Schippers, and Erich Lenk, both of Remscheid, Germany, assignors to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Wuppertal, Germany

Filed June 25, 1975, Ser. No. 590,119

Claims priority, application Germany, July 1, 1974, 2431567

Int. Cl.² B65H 67/04

U.S. Cl. 242—41 3 Claims



1. In a winding machine having at least two rotatable bobbin-holding chucks mounted in a cantilevered projecting man-

ner on a rotatable or pivotal bobbin revolver adapted to shift each chuck and its associated bobbin tube or package in a rotating or pivoting movement from an upper operative chuck winding position to a lower inoperative chuck position, the improvement which comprises:

ejector means for dislodging the finished bobbin package from the chuck in its lower inoperative position; and

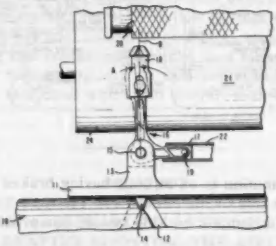
take-up means for receiving said finished package after being dislodged from the chuck in its lower inoperative position, said take-up means being arranged below the chuck in its inoperative position in close proximity to the circumference of the finished package thereon and including supporting members arranged asymmetrically relative to the vertical axial plane of the chuck in its lower inoperative position to provide a receiving cradle inclined from the horizontal towards the rotating or pivoting movement of the bobbin revolver by which a chuck carrying the finished package is shifted into its lower inoperative position; and means to axially extend said take-up means outwardly of the chucks to hold the dislodged finished package in front of the outboard end of the chucks.

4,007,885

FLEXIBLE TRAVERSE GUIDE ASSEMBLY

James Weaver Hare, Martinsville, Va., and Allan Bryce Hughes, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed June 17, 1975, Ser. No. 588,220
Int. Cl.² B65H *54/28, 57/00*
U.S. Cl. 242—43 R **2 Claims**



1. In a yarn winding apparatus including a rotatable driven barrel cam having a continuous helical groove in its surface, a cam follower riding in said groove and means limiting the follower to a reciprocating linear path of travel between cam reversal points, a yarn guide and a slide block mounted for reciprocating linear travel the improvement comprising: a resilient L-shaped arm having two legs joined at a junction, said yarn guide being connected to the end of one of said legs, said slide block being connected to the end of the other of said legs, said cam follower being connected to said arm at the junction of said legs, each of said legs being independently flexible, said leg connected to said yarn guide being capable of being flexed at an angle from about 2.5° to about 6.5° with respect to a plane perpendicular to said leg connected to said slide block during the cam reversal, as governed by the flexibility of said legs.

4,007,886

LINE WINDER

Bernard Kaminstein, 329 Franklin Place, Paramus, N.J. 07652

Filed Aug. 8, 1975, Ser. No. 603,008
Int. Cl.² A01K *89/00*
U.S. Cl. 242—84.2 R **11 Claims**

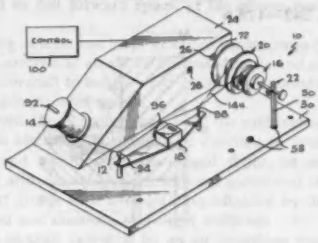
1. A line winder for winding a line on a reel of the type which has an elongated strip-shaped reel base, a reel, and with a rotatable handle, comprising:

a winder base;

a reel holder mounted on said winder base, for holding the base of a reel; and

motor means mounted on said base for rotating a reel which is on said holder;

said reel holder including a frame with a longitudinally-



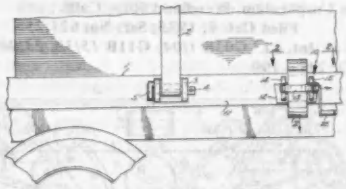
extending portion, a bracket longitudinally positionable along said longitudinally-extending portion of said frame and having a pair of spaced legs for receiving the ends of a reel base between the legs and frame, and a cam assembly coupled to said frame and bracket for clamping said legs of said bracket and the ends of the reel base thereunder on said frame.

4,007,887

STRAP ROLLING DEVICE

Lester J. Vice, Hillsboro, Oreg., assignor to Eugene H. Braukman, Cornelius and Gerald A. Kramer, Forest Grove, both of, Oreg.

Filed Sept. 26, 1975, Ser. No. 616,937
Int. Cl.² B65H *17/46*
U.S. Cl. 242—86.5 R **4 Claims**



1. A device for temporary attachment to a mobile base for rolling up elongate flexible material, said device comprising,

a frame member including retention means,

means detachably coupling said frame member to said mobile base, and

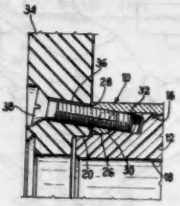
a spindle assembly including a spindle defining a longitudinally orientated open ended opening to receive one end of the flexible material to be rolled in a manner permitting axial separation of the subsequently rolled material and said spindle, said spindle assembly further including retention means cooperating with the first mentioned retention means and a bearing housing within which one end portion of said spindle is journaled, said bearing housing being in detachable engagement with said frame member to permit axial extraction of the spindle assembly from material rolled thereon and the frame member.

4,007,888

YARN BOBBIN AND METHOD FOR MANUFACTURING THE SAME

Enzo Scaglia, Brembilla (Bergamo), Italy, assignor to M. Scaglia S.p.A., Milan, Italy

Filed July 14, 1975, Ser. No. 595,422
Int. Cl.² B65H *75/14*
U.S. Cl. 242—118.6 **4 Claims**



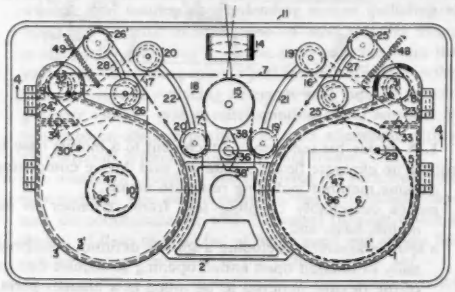
3. A yarn bobbin comprising:
a tubular metallic core member having opposite end portions;
a pair of centrally bored plastic inserts, one each force fitted into opposite ends of said core member, each said insert having at the outer end thereof a radially outwardly facing annular recess and a reduced outer diameter cylindrical stepped surface;
each said end portion of said core member being deformed inwardly and rearwardly in the form of a spirally-coiled curl-shaped bead seated in a respective said recess;
radially inwardly inclined threaded holes extending through each said bead and at least partially through the respective said insert;
a pair of flanges, each having a central bore positioned against and centered around a respective said stepped surface, each said flange abutting the end of a respective said bead; and
thread means, extending through each said flange and the respective said holes, for securing said flanges to said core member and the respective said inserts.

4,007,889

FLOW CAMERA FILM TRANSPORT

Forrest L. Langford, Northridge, Calif., assignor to Terminal Data Corporation, Woodland Hills, Calif.

Filed Oct. 9, 1975, Ser. No. 621,255
Int. Cl.² G03B *1/04*; G11B *15/32*, *23/04*
U.S. Cl. 242—199 **10 Claims**



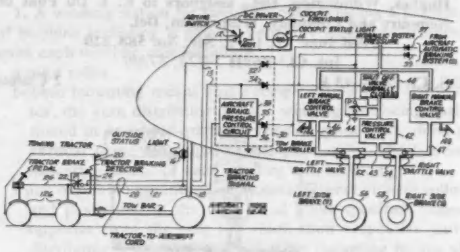
1. An intermittently operable flow camera film transport system, comprising;
a. a film cassette (1, 2, 3) for enclosing both extremities of a strip of film (7),
b. an intermittently operable capstan (15) to drive said film only when the exposure of a document thereon is to occur,
c. two pairs of members positioned on opposite sides of said capstan, with a member of each pair on opposite sides of said strip of film, to guide the film from said cassette (1) to said capstan and from said capstan back to said cassette (3),
d. a mechanism (36–44) attached to and controlling said members to move the members of each pair oppositely away from the path of said film from said cassette to said capstan and from said capstan to said cassette (7')
to allow said cassette with said film (7) to be removably installed into said camera, and
e. plural clutch means (52, 54) upon said transport system to control the egress and ingress of said film from said cassette.

4,007,890

AIRCRAFT TOWING BRAKING SYSTEM

Allen Robert Bremer, Seattle, and Garrett Howard De Vlieg, Bellevue, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Sept. 30, 1975, Ser. No. 618,297
Int. Cl.² B60T *13/68*
U.S. Cl. 244—50 **1 Claim**

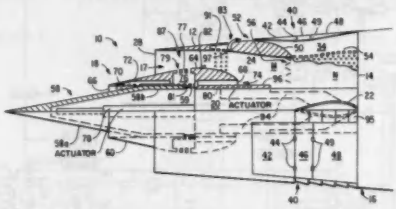


1. In combination in an aircraft having brakes on one side and the other side of the aircraft:
an aircraft automatic braking system comprising in combination;
means for generating an aircraft brake pressure control signal;
automatic braking pressure modulating valve means responsive to said brake pressure control signal for metering automatic braking pressure to first shuttle valve means for application to said brakes on one side of said aircraft and second shuttle valve means for application to said brakes on the other side of said aircraft;
first manually controlled pressure metering valve means coupled to said first shuttle valve means and second manually controlled pressure metering valve means coupled to said second shuttle valve means, each of said first and second shuttle valve means arranged for transmitting the greater of manually OR automatically controlled pressures for application to the brakes on the respective sides of the aircraft;
a tractor braking system for providing tractor braking pressure for application to the brakes of the tractor;
means for detecting tractor braking pressure;
said means coupled to said means for generating an aircraft brake pressure control signal; and,
wherein said means for generating an aircraft brake pressure control signal comprises aircraft brake pressure control circuit means for increasing brake pressure at a preset rate in response to detection of tractor braking pressure above a predetermined threshold level and decreasing brake pressure at a preset rate in response to detection of tractor braking pressure below a predetermined threshold level.

4,007,891
JET ENGINE AIR INTAKE SYSTEM

Norman E. Sorensen, Saratoga, and Eldon A. Latham, Sunnyvale, both of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Sept. 12, 1975, Ser. No. 612,899
Int. Cl.² B64D *33/02*
U.S. Cl. 244—53 B 11 Claims

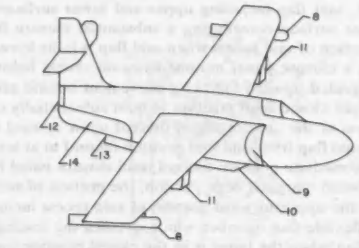


1. An axisymmetric air intake system for a jet aircraft engine comprising a fixed cowl extending outwardly from the face of said engine, a centerbody coaxially disposed within said cowl, said cowl and said centerbody defining a main airflow passageway therebetween with a throat, means for axially displacing said centerbody within said cowl so as to change the position of said throat for optimum performance at different aircraft speeds, means for increasing airflow to said jet engine face at least at aircraft speeds from takeoff to transonic, said last-named means including a cowl auxiliary airflow assembly and a forwardly located closeable air inlet in said centerbody, a centerbody airflow passageway connecting said centerbody inlet to said engine face, means for opening and closing said centerbody air inlet, and means for bleeding air from a region adjacent to said centerbody to a region external to said cowl when said aircraft is in the supersonic mode.

4,007,892
AIRCRAFT FLIGHT METHOD AND APPARATUS FOR BOOSTING AN AIRCRAFT TO A VERY HIGH ALTITUDE AND THEREAFTER BOOSTING THE AIRCRAFT TO A HIGH RATE OF FORWARD SPEED

Alga M. Tabor, 907 Darlene Lane, Arlington, Tex. 76010

Continuation-in-part of Ser. No. 163,061, July 15, 1971, abandoned, which is a continuation-in-part of Ser. No. 833,893, June 12, 1969. This application Jan. 24, 1975, Ser. No. 543,777
Int. Cl.² B64D *33/00*
U.S. Cl. 244—62 26 Claims



1. In a flight method for improving the performance of an aircraft powered by an air breathing engine, the thrust of which is dependent during flight upon the function of rotating airfoils appurtenant thereto; the said aircraft and engine being adapted for and provided with suitable means for the utilization of oxygen booster system assistance; and the said aircraft and engine being adapted for and provided with suitable means for the effective intake and utilization of mass flow air; the steps comprising

elevating the aircraft to an above normal altitude; placing the aircraft in a flight attitude suitable for forward acceleration at the above normal altitude; accelerating the aircraft to full forward speed at the above normal altitude;

performing at least one step, included in said steps of elevating the aircraft to an above normal altitude and accelerating the aircraft to full forward speed, with assistance from an oxygen booster system;

whereby one functional advantage of the said method is that such an aircraft can thereby be enabled to attain unassisted and significantly prolonged flight, at an above normal altitude, at a higher forward speed and at a lower angle of attack than it could have attained by the use of standard and conventional flight methods.

10. In an aircraft powered by an air breathing engine, the thrust of which is dependent during flight upon the function of rotating rotor airfoils appurtenant thereto, means for improving the flight performance of said aircraft and said engine comprising, in operative combination

driving means of the said engine for providing rotary power to rotor airfoils of said engine;

interconnecting controllable variable speed drive transmission means for transmitting rotary power from said engine driving means to the said rotor airfoils;

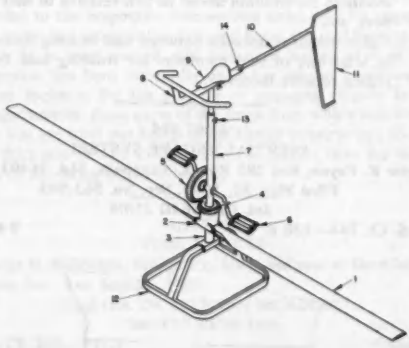
and means for compensating for the momentary torque overload caused by the use of the said variable speed drive transmission means in stepping up the rotational speed of the said rotor airfoils relative to the rotational speed of the said engine driving means therefor;

whereby one function of the said combination is to enable the said aircraft to utilize more of its available engine power for producing thrust at very high forward flight speed; and whereby another function of said combination is to enable such an aircraft to utilize more of its potential engine power at above normal altitude to produce additional thrust.

4,007,893
HOMOCOPTER

Hariton Khachikian, 5322 Russell Ave., Apt. No. 1, Los Angeles, Calif. 90027

Filed Oct. 28, 1975, Ser. No. 626,577
Int. Cl.² B64C *31/04*
U.S. Cl. 244—64 2 Claims



1. A flying vehicle comprising a main column; a rotary wing assembly composed by two blades connected both to a central hub, which rotates on a main axle, said main axle being connected to the lower end of said main column; a landing sup-

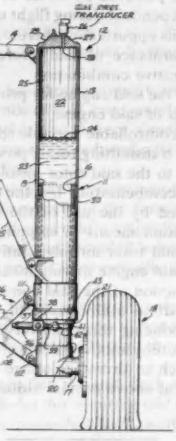
port being fixed at the lower end of said main axle; an assembly composed by a pair of pedals and a main bevel gear fixed on the same axis of rotation as the pedals and this assembly rotates in a transversal bearing provided in the main column, above the hub; said bevel gear is connected to a secondary bevel gear fixed on the upper side of the hub and makes possible direct transmission of the human power from the pedals to the rotary wing.

4,007,894

METHOD AND APPARATUS FOR MINIMIZING AXIAL FRICTION FORCES IN A CYLINDER-PISTON SHOCK ABSORBER

Erwin H. Hartel, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Dec. 4, 1975, Ser. No. 637,576
Int. Cl.² B64C *25/60*
U.S. Cl. 244—104 FP **10 Claims**



1. In a shock absorber assembly including a circular cylinder member and a piston member disposed for axial reciprocation in said cylinder member, the combination with said cylinder and piston members comprising:

bearing means of annular configuration disposed coaxially with and radially between said cylinder and piston members for supportively guiding the axial reciprocation of said piston member, said bearing means being formed and mounted for rotation about its axis relative to said members; and

actuator means connected between said bearing means and at least one of said members for rotating said bearing means relative thereto.

4,007,895

INERTIAL ESCAPE SYSTEM

Peter R. Payne, Box 282 Rte. 5, Annapolis, Md. 21401

Filed Mar. 31, 1975, Ser. No. 563,903
Int. Cl.² B64D *25/08*
U.S. Cl. 244—138 R **9 Claims**

1. A system for the ejection of a crew member from an aircraft comprising:

a mass disposed in said aircraft and disposed for ejection therefrom;

means for ejecting said mass;

A Kevlar pendant coupled between said mass and said crew member; and

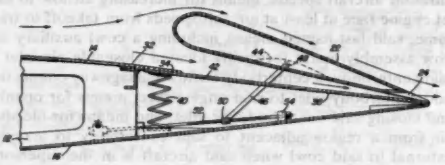
means for releasing said pendant and said mass from said crew member when said crew member has cleared the aircraft, said means for releasing comprising a section of said pendant of reduced diameter sized to part when the peak loading is reached on the pendant.

4,007,896

UPWARDLY EXTENDIBLE WING FLAP SYSTEM

Collins J. Reynolds, III, 1615 Krameria St., Denver, Colo. 80220

Filed Aug. 8, 1975, Ser. No. 603,246
Int. Cl.² B64C *9/18*
U.S. Cl. 244—42 D **6 Claims**



1. In combination, a wing including leading and trailing marginal edge portions and upper and lower surfaces, the trailing marginal edge portion of said wing including a recess formed therein opening upwardly through said upper surface of and extending along said trailing marginal edge portion, a flap including leading and trailing edges, mounting means mounting said flap from said wing for guided shifting relative thereto along an upstanding path between a first lower retracted limit position at least substantially fully received in said recess, a second fully raised limit position upwardly displaced above said upper surface and with said flap disposed at a substantially greater angle of attack than said wing and a third partially raised somewhat lower intermediate extended position between said limit positions with said flap disposed only slightly above said upper surface and at an angle of attack greater than said wing but less than the first mentioned angle of attack, said flap including upper and lower surfaces, said flap upper surface constituting a substantial closure for the upper portion of said recess when said flap is in its lower limit position, a closure panel mounted in said recess below said flap for guided upward following movement behind said flap to an upper closed limit position at least substantially closing said recess at the upper portion thereof upon upward movement of said flap from said first position thereof to at least said third intermediate position thereof, said closure panel including a forward marginal edge portion, the portion of said wing defining the upper forward portion of said recess including a trailing flexible flap member which overlies the leading edge of said flap when the latter is in the closed position and past which the leading edge of said flap is movable, as a result of deflection of said flap member, upon movement of said flap back and forth between said first and third positions thereof, said flap member overlying the forward marginal edge portion of said closure panel when said closure panel is in the closed position thereof.

4,007,897

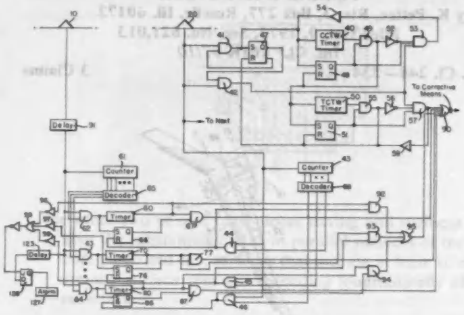
CONTROL SYSTEM FOR MONITORING VEHICLE PASSAGE AT PREDETERMINED LOCATIONS

John H. Auer, Jr., Fairport, N.Y., assignor to General Signal Corporation, Rochester, N.Y.

Filed Sept. 9, 1975, Ser. No. 611,742

Int. Cl.² B61L *23/00*

U.S. Cl. 246—187 B **19 Claims**



1. A control system for monitoring operation of a plurality of self-propelled vehicles moving along a guideway for assuring safety of operation, comprising;

a plurality of vehicle detectors at predetermined locations along said guideway for detecting passage of a vehicle,

means responsive to actuation of one of said detectors by a leading and a trailing vehicle for determining time separation between said vehicles, and for allowing continued vehicle travel if actual time separation is greater than a first predetermined time period.

15. A method of ensuring safe operation of vehicles traveling along a guideway in which a plurality of vehicle detectors are spaced along said guideway for detection of vehicles passing said detectors comprising the steps of:

a. detecting passage of a vehicle at a detector,

b. detecting passage of a subsequent vehicle at said detector,

c. comparing the time separation between said detections with a first predetermined time period, and

d. allowing continued vehicle travel if said time separation is greater than said predetermined time period.

4,007,898

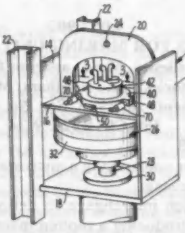
TORQUE COLLAR FOR HIGH TORQUE MOTORS

Michael G. Brenner, Pleasanton, and Gordon M. Brenner, Walnut Creek, both of Calif., assignors to M.G.B., Inc., Berkeley, Calif.

Filed May 12, 1975, Ser. No. 576,971

Int. Cl.² F04F *1/06;* **F02C** *7/20*

U.S. Cl. 248—26 **4 Claims**



1. Torque resisting apparatus for use in combination with a high torque motor having a stator, a rotor mounted for rotation relative to said stator about an axis of rotation, and a plurality of torque transmitting means mounted on the stator in angularly spaced relationship about said axis of rotation to resist torque applied to the stator by the rotor, said apparatus comprising: a torque collar adapted to be disposed in an operative condition relative to the stator; stops carried by the collar, said stops each having a pair of opposed surfaces disposed for engagement with the torque transmitting means of a stator disposed in operative condition relative to the collar; a screw threaded member secured to each of the surfaces and extending through a mounting block therefor fixed to the collar; and means threadably received on the screw threaded members, said means being threadable on the threaded members to adjust the positions of the surfaces relative to the mounting blocks and lock the surfaces at select positions relative to the blocks to enable the adjustment of the opposed surfaces of the stops relative to torque transmitting means disposed for engagement therewith to provide for relative free play between the stops and torque transmitting means and simultaneous engagement of all of the stops and torque transmitting means at the end of said free play.

4,007,899

LATTICE CONSTRUCTION

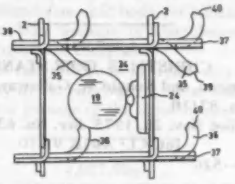
Gijsbrecht Gerhardus Piepers, Heiloo, and Christiaan Gustaaf Adolf Scholtus, Alkmaar, both of Netherlands, assignors to Reactor Centrum Nederland, The Hague, Netherlands

Division of Ser. No. 238,286, March 27, 1972, Pat. No. 3,886,438. This application Mar. 13, 1974, Ser. No. 450,863

Claims priority, application Netherlands, Mar. 26, 1971, 7104076

Int. Cl.² E04C *2/42*

U.S. Cl. 248—49 **4 Claims**



1. A lattice constructed of a set of parallel elongated first strips residing in a given plane and a set of parallel elongated second strips also residing in said plane, said sets of first and second strips intersecting and engaging at a plurality of complementary spaced-apart incisions each of which extends from one edge of each strip toward the opposite edge of the respective strip, whereby said sets of strips form compartments, each edge portion of each strip having a lip stamped out of the material of the strip at the intersection points so as to extend parallel to the respective intersecting strip, said lip engaging the respective intersecting strip and being secured thereto, the strips of at least one of said sets each having at least two extension lips bent outwardly on either side at locations between incisions for the purpose of engaging objects in the compartments, those parts of the strips from which said extension lips are bent out being of thickened construction so that the thickness of said extension lips is greater than the thickness of the strips of the other set.

4,007,900

TUBE HANGER

George H. Holoubek, Muscatine, Iowa, assignor to Dart Industries Inc., Los Angeles, Calif.

Filed Oct. 20, 1975, Ser. No. 624,027

Int. Cl.² B67D *5/06*

U.S. Cl. 248—311.1 **4 Claims**

1. A means for hanging a tube from a wall projection, said tube including a bottom sealing flange having a longitudinal dimension greater than the tube body width whereby the opposing lateral ends of said flange extend beyond the tube body proper comprising:

a thin flexible plastic part having a hanger portion for engagement with a wall projection and a tube attachment portion, said hanger portion comprising at least one slit and having a size sufficient to overlie a wall projection and said tube attachment portion comprising an elongated cut through said part having an overall length about

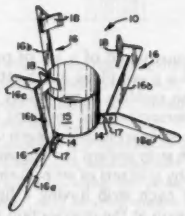
equal to the width of said tube body and less than the longitudinal length of said tube bottom sealing flange whereby the opposing lateral ends of said flange will resiliently grip said plastic part proximate the area at each end of said elongated cut beyond where said cut terminates.

4,007,901

CHRISTMAS TREE STAND

Angelo J. Mancini, and Ronald W. Galloway, both of Box 517, Afton, Wyo. 83110

Filed Nov. 20, 1975, Ser. No. 633,678
Int. Cl.² A01K *97/10*
U.S. Cl. 248—526 **1 Claim**



1. A support stand for Christmas trees and the like comprising a generally Y-shaped base;

an open topped support vessel having its bottom mounted on said base such that portions of said Y-shaped support member project as extensions from beneath the vessel;

a support member pivotally connected to each extension, said support members each including an outwardly projecting leg portion and an upwardly and inwardly projecting arm portion and said support members being pivotally connected to said projections at the intersection of said leg and arm members, the exterior angles between said leg portions and said arm portions being between 102-106 degrees;

a partial collar fixed to and extending transversely with respect to the inwardly projecting portion of each arm and outwardly thereof, each said collar being of generally arcuate configuration, whereby the partial collar on the inwardly projecting arm portion pivots to a position well above and spaced from the top of the support vessel;

a spike extending upwardly within the vessel from the center base thereof; and

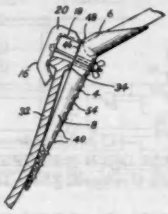
said outwardly projecting leg portion being about 1½ times the length of the extensions of the Y-shaped support member, and the upwardly extending portion of the arm and the height of the vessel being respectively about 2 1/10 and 1 1/10 times the length of the extensions.

4,007,902

FISHING ROD HOLDER

Gary K. Pettee, Rte. 3, Box 277, Roselle, Ill. 60172

Filed Oct. 9, 1975, Ser. No. 621,013
Int. Cl.² A01K *97/10*
U.S. Cl. 248—534 **3 Claims**



1. A holder for a fishing rod capable of insertion into the ground and attachment to a boat comprising in combination:

a tapered substantially U-shaped bottom portion having a tip section insertable in the ground and an end section opposite said tip section, said end section defining a plurality of grooves along opposed edges of the U-shaped portion therealong and an opening therethrough;

a hollow top portion integral with said tapered substantially U-shaped bottom portion and extending from said end section at an acute angle, said hollow top portion defining a longitudinal opening therethrough for receipt of said fishing rod, said hollow top portion having a tapered end section to facilitate insertion of said fishing rod;

a bracket including a leading edge and a slot therethrough, said leading edge being adapted to engage a pair of said opposed grooves of said tapered, substantially U-shaped bottom portion in an assembled state; and

means for securing said bracket to said tapered, substantially U-shaped bottom portion in said assembled state, said securing means passing through said slot in said bracket and said opening in said end section of said tapered, substantially U-shaped bottom portion, said bracket pivoting substantially about the engagement of said leading edge and said tapered, substantially U-shaped bottom portion, said tapered, substantially U-shaped bottom portion, said bracket, and said securing means cooperatively defining means for adjustably clamping said holder to said boat.

4,007,903

APPARATUS FOR MAKING UNITARY CASING

Gordon Riblet, Wellesley, Mass., assignor to Microwave Development Laboratories, Inc., Needham, Mass.

Filed Sept. 18, 1975, Ser. No. 614,449
Int. Cl.² B22C *9/24*
U.S. Cl. 249—145 **13 Claims**

1. Apparatus for constructng a microwave circulator having three ports comprising:

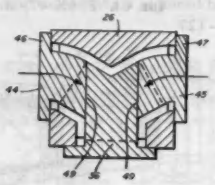
two pieces which interengage to define a mold and have means for introducing a molten material into the mold, said two pieces defining three passages meeting inside the mold at a common passage interconnecting area,

three core pieces which interengage or abut when inserted respectively in the three passages in the mold to define a mold core,

means for maintaining each core piece symmetrically in its

associated passage of the mold, a space being provided between the core and pieces for being filled about the core with the molten material to thereby define walls of the circulator,

one of said core pieces being longer than the other two core pieces including substantially straight parallel side surfaces and having a rectangular cross-section,



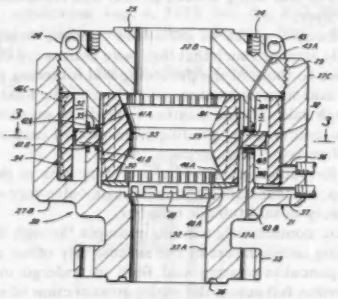
the other two of said core pieces having end surfaces that abut the substantially straight parallel surfaces of the one core piece and side surfaces that include at least an outer arcuate surface segment extending longitudinally of the core pieces.

4,007,904

ANNULAR BLOWOUT PREVENTER

Marvin R. Jones, Houston, Tex., assignor to Cameron Iron Works, Inc., Houston, Tex.

Filed Mar. 28, 1975, Ser. No. 563,194
Int. Cl.² E21B 33/06
U.S. Cl. 251—1 B **37 Claims**



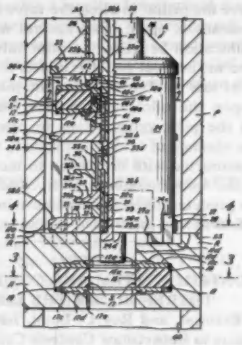
1. An annular blowout preventer, comprising a housing having a vertical bore therethrough, an annular recess in the bore, and an annular chamber about the recess and divided therefrom by a wall, a packer comprising a contractible annulus of resilient material disposed within the recess, a piston comprising a contractible annulus of resilient material sealably slidable within the chamber for movement toward the bore, means extending sealably through the wall for transmitting the inward movement of the piston to the packer to contract it into sealing engagement about an object in the bore or upon itself when the bore is empty, the upper end of the packer being sealably engageable with the top side of the recess as said packer is so contracted, and the outer surface of the packer being fluidly connected with the bore of the housing, and passageway means in the housing connecting with the chamber on the outer surface of the piston to permit operating fluid to be introduced thereto or exhausted therefrom.

4,007,905

RETRIEVABLE BLOW-OUT PREVENTER RAM SEALS

James D. Mott, Houston, Tex., assignor to Hydril Company

Continuation of Ser. No. 327,627, Jan. 29, 1973, abandoned, which is a division of Ser. No. 127,881, March 25, 1971, Pat. No. 3,737,974. This application Feb. 24, 1975, Ser. No. 552,540
Int. Cl.² E21B 33/06
U.S. Cl. 251—1 R **53 Claims**



1. An improved ram seal for a ram type blowout preventer having reciprocating ram means operably carrying the improved ram seal apparatus, said improved ram seal apparatus comprising a resilient ram seal body for blocking undesired flow through the flow passage of the blowout preventer, wherein the improvement comprises:

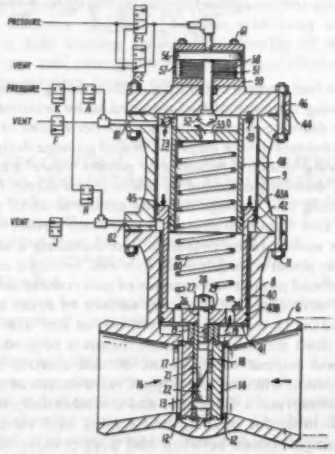
means with said ram seal body for releasably securing said ram seal body to the blowout preventer ram means from inside the flow passage of the blowout preventer.

4,007,906

MAIN STEAM ISOLATION VALVE

Anatole N. Karpenko, San Francisco, Calif., assignor to Anchor/Darling Valve Company, Hayward, Calif.

Continuation-in-part of Ser. No. 432,858, Jan. 14, 1974, abandoned. This application June 16, 1975, Ser. No. 586,964
Int. Cl.² F16K 31/122
U.S. Cl. 251—26 **11 Claims**



7. A fail safe valve, comprising: a valve body having inlet passage means and outlet passage means and a valve seat between the inlet and outlet passage means, a cylinder on the

valve body, a piston reciprocable in the cylinder, a valve member movably mounted in the valve body between open and closed positions relative to the seat, means connecting the piston with the valve member to move the valve member to its open and closed positions, fluid passage means extending from the inlet passage means to the cylinder on opposite sides of the piston to introduce fluid pressure thereto from the inlet passage means, a fluid pressure operated pilot valve means in operative association with the fluid passage means to selectively control introduction of fluid pressure to one side of the piston to move the piston to close the valve member when the pilot valve means is open, pilot control means establishing fluid communication between the pilot valve means and the fluid pressure in the inlet passage means to selectively introduce and vent said fluid pressure to the pilot valve means to close and open the pilot valve means, biasing means connected with the pilot valve means to open the pilot valve means in the absence of said fluid pressure thereon, and biasing means connected with the piston to move the piston and thus move the valve member to its closed position in the absence of a predetermined fluid pressure in said inlet passage means and thus at said pilot valve means and in said cylinder.

4,007,907

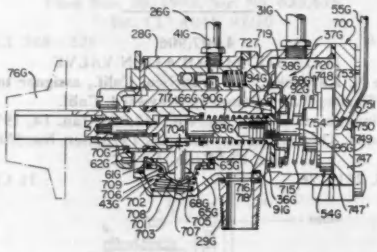
FUEL CONTROL SYSTEM AND CONTROL DEVICE THEREFORE OR THE LIKE

Charles D. Branson, and Roy C. Demi, both of Greensburg, Pa., assignors to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 530,605, Dec. 9, 1974, Published Application No. B530,605, and a continuation-in-part of Ser. No. 443,783, Feb. 19, 1974, abandoned, which is a continuation-in-part of Ser. No. 380,389, July 18, 1973, abandoned. This application Apr. 23, 1975, Ser. No. 570,864

Int. Cl.² F16K *31/524*

U.S. Cl. 251—85 **17 Claims**



1. In a fuel control system for a fuel burning apparatus or the like having a source of fuel adapted to be interconnected by passage defining means to a main burner means of said apparatus, a control device disposed in said passage defining means and having selector means and poppet valve means that is directly manually operated by said selector means for opening and closing said passage defining means so as to control the flow of fuel from said source to said main burner means, said selector means being rotatable and including a shaft means rotatable about a longitudinal axis and having a cam surface thereon, said poppet valve means of said control device having a valve stem engaging said cam surface to cause said poppet valve means to be moved transversely to said axis of rotation of said shaft means as said shaft means is rotated to open or close said poppet valve means of said control device, the improvement wherein said poppet valve means of said control device comprises a valve seat and a substantially rigid poppet valve member for opening and closing said valve seat, said stem being disposed between said poppet valve member and said cam surface and projecting through said valve seat, said control device having means for causing said poppet valve member to tilt relative to said valve seat as said poppet valve member opens said valve seat.

4,007,908

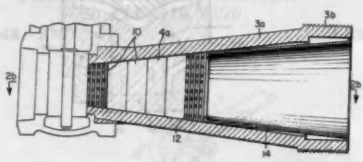
PROCESS AND DEVICE FOR ATTENUATING NOISE CAUSED BY A VALVE DURING THE EXPANSION OF A FLUID

Paul V. Smagghe, Colombes, and Raymond B. Villier, Conde-sur-Noireau, both of France, assignors to Masoneilan International, Inc., Norwood, Mass.

Filed May 9, 1975, Ser. No. 576,033

Int. Cl.² F16K *47/08*

U.S. Cl. 251—127 **9 Claims**



1. Throttling apparatus for reducing flowing fluid pressure with attenuation of fluid-expansion-generated noise and cavitation comprising, in combination,

a pressure reducing valve having a downstream face;

means for attenuating the noise or cavitation generated by the expansion of fluid flowing through said valve to a downstream pipe, said attenuating means comprising

an at least partially cone-shaped tubular member provided between said valve and downstream pipe,

wire grill, sinuous passage forming means transversely spanning across and fitting within said member beginning substantially at said downstream face of said valve,

said wire grill means defining a series of juxtaposed pancakes filling a length of said tubular member,

each said pancake composed of a series of perforated plates solidly joined to each other,

each said plate formed of a lattice of criss crossed wires,

each said lattice comprising a first transverse plane layer of parallel straight wires and a second transverse plane layer of parallel straight wires oriented substantially at right angles to and being welded to said first transverse plane wire layer,

the perforated plates of each said pancake being transversely arranged such that their wire lattices are displaced relative to those of the preceding and following plates to form said sinuous passages and whereby the fluid flowing through said tubular member is made to encounter and follow continuously winding paths around each succeeding plate layer, and

means for retaining said wire grill pancakes in their said juxtaposed, substantially downstream-valve-face-engaged assembly in said tubular member,

the open, continuously winding passages through the mesh forming lattice layers of the successively offset plates of said pancakes causing said fluid to undergo maximum expansion full across the entire cross-section of said pancakes under slightly open as well as under full open settings of said valve.

4,007,909

FULL FLOW VALVED FITTING

Richard A. Buseth, Jackson, and Russell L. Rogers, Munith, both of Mich., assignors to Aeroquip Corporation, Jackson, Mich.

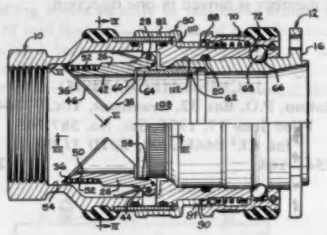
Filed Oct. 16, 1975, Ser. No. 622,779

Int. Cl.² F16L *29/00, 37/28*

U.S. Cl. 251—149.2 **13 Claims**

1. A valved coupling characterized by its ability to convey high fluid capacities with low flow resistance comprising, in combination, a first body half having a passage defined therein having an inlet end and a connecting end, a second body half having a passage defined therein having an outlet end and an inlet end, said second body half including an annular tubular

nose concentric with its associated passage inlet end receivable into said first body half passage connecting end and having a cylindrical passage, connecting means defined upon said body halves interengaging upon said body halves being coupled, a plurality of valve elements pivotally mounted in said first body half passage pivotal between open and closed positions, pivot means pivotally supporting said valve elements on said first body half, each of said valve elements comprising an arcuate cross-sectional segment having an inner



surface of a substantially cylindrical configuration of a radius substantially equal to the radius of said nose cylindrical passage, a nose abutment recess defined in each of said valve elements adjacent the associated pivot means and radially inwardly spaced therefrom, said second body half nose engaging and being received within said recesses upon said body halves being coupled maintaining said valve elements in said open position whereby said second body half cylindrical passage and valve element inner surfaces define a substantially cylindrical nonrestricted flow passage through the coupling.

4,007,910

BUTTERFLY VALVE APPARATUS

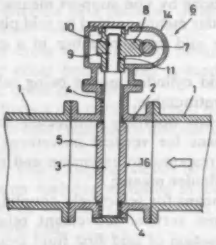
Masahiro Yasuoka, and Yoshitsugu Okada, both of Hirakata, Japan, assignors to Kubota, Ltd., Osaka, Japan

Division of Ser. No. 419,368, Nov. 27, 1973, abandoned. This application Aug. 6, 1975, Ser. No. 602,300

Claims priority, application Japan, Nov. 30, 1972, 47-120382

Int. Cl.² F16K *31/44*

U.S. Cl. 251—229 **2 Claims**



1. A butterfly valve comprising:

a housing including a tubular portion for carrying fluid therethrough;

a rotatable valve shaft arranged to penetrate said tubular portion perpendicularly to the axis thereof, said valve shaft being held in sleeve bearings located adjacent to opposite walls of said tubular portion and further including a drive stem with a rectangular cross section;

a butterfly valve plate fixedly mounted on said rotatable valve shaft in said tubular portion;

a lever system having an aperture arranged to receive the drive stem of said valve shaft and being capable of converting a rectilinear motion to a rotary motion; and

means for oscillating said lever system the improvement wherein:

said lever system has a rectangular means defining an opening including opposed longitudinal side dimensions which are perpendicular to the plane of said butterfly valve plate and transverse dimensions of said rectangular means defining the opening lies in planes parallel with said butterfly valve, said valve stem further including a stem portion of rectangular configuration complemental to said rectangular means defining the opening in said lever system and having a smaller longitudinal dimension than said lever system opening to thereby permit limited relative sliding movement of said complementally formed elements to thereby compensate for radial clearance in said bearings as well as to relieve pressure on the means motivating said lever system.

4,007,911

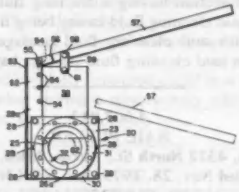
PACKINGLESS GATE VALVE AND ACTUATOR ASSEMBLIES

Curtis W. Clarkson, Palo Alto, Calif., assignor to The J. R. Clarkson Company, Palo Alto, Calif.

Division of Ser. No. 459,949, April 11, 1974, Pat. No. 3,945,604. This application Apr. 24, 1975, Ser. No. 571,274

Int. Cl.² F16K *3/312, 3/32*

U.S. Cl. 251—233 **12 Claims**



1. In a gate valve and actuator assembly, a valve housing having a through fluid flow passage, means defining a transverse gate valve chamber in said housing, a gate valve member slidably mounted in said chamber between positions where it permits or blocks flow through said passage, an actuator operably connected to said gate valve member, and means providing a plurality of adjacent spaced sockets in a row on said housing each disposed at a different distance from said passage and adapted to detachably pivotally receive an end of said lever whereby said lever may be selectively pivotally mounted on said housing at any of a plurality of different distances from said passage for effecting staged displacement of said valve member in said passage.

4,007,912

PLUG TYPE CONTROL VALVE HAVING IMPROVED MEANS PROTECTING THE STEM THEREOF

Tommy L. Wells, Houston, Tex., assignor to Pullman Incorporated, Chicago, Ill.

Filed Nov. 13, 1975, Ser. No. 631,769

Int. Cl.² B01J *8/08*; F16K *41/02*

U.S. Cl. 251—355 **8 Claims**

1. A plug valve for controlling flow of an abrasive material through a mouth of a conduit, comprising:

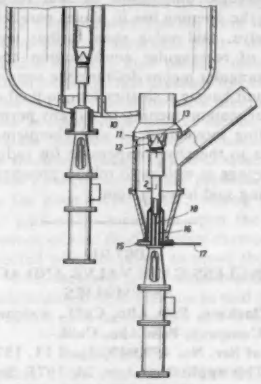
a housing;

a valve stem movable within said housing;

plug means mounted with said valve stem for movement between a first position in which said plug means blocks flow of abrasive material through the mouth of the conduit and a second position in which said plug means permits flow of abrasive material through the mouth of the conduit; and

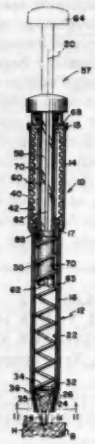
shroud means for protecting said valve stem from the abrasive material, said shroud means including:

a tail section mounted with said housing and encircling a first portion of said valve stem, said tail section having an inner diameter greater than the outer diameter of said valve stem to form a cleaning fluid passageway between said tail section and said stem; and



a head section mounted with said stem for movement therewith and encircling a second portion of said valve stem, said head section having a cleaning fluid cavity formed therein, said cleaning fluid cavity being in fluid communication with said cleaning fluid passageway to exhaust fluid from said cleaning fluid passageway.

4,007,913
NAIL PULLER
Ward Aldrich, 4322 North St., Akron, Mich. 48701
Filed Nov. 28, 1975, Ser. No. 636,051
Int. Cl.² B25C *11/00*
U.S. Cl. 254—18 **19 Claims**



1. A nail puller comprising:

a tubular casing having an opening at at least one axial end thereof,

a hollow nail lifting member mounted in said casing for axial movement therein,

nail gripping jaws mounted on said lifting member for movement therewith and relative thereto between axially outward, radially contracted, nail gripping positions and radially spread, axially inwardly retracted positions;

means for axially withdrawing said lifting member and said jaws carried thereby axially inwardly in a direction away from said one end comprising:

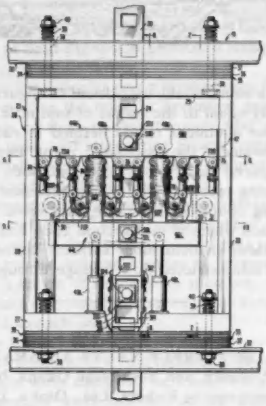
a rotatable member received in said casing and threadedly coupled to said lifting member;

means for rotating said rotatable member comprising

a linearly reciprocable member movable in a to and fro path of travel; and

means reacting between said reciprocable member and said rotatable member for converting linear motion to rotary motion to drive said rotatable member when said reciprocable member is moved in one direction.

4,007,914
JACKING MECHANISM
John R. Sutton, P.O. Box 32, Beaumont, Tex. 77704
Filed June 17, 1975, Ser. No. 587,705
Int. Cl.² B66F *1/00*; E02D *21/00*
U.S. Cl. 254—108 **23 Claims**



1. Jacking apparatus for effecting relative vertical movement between an upright leg and a platform, said jacking apparatus comprising:

frame means, including generally horizontally spaced support means mounted on said platform and a generally horizontal cross member supported at horizontally spaced locations by said support means;

first fluid cylinder means carried by said platform and being mounted on said cross member in a generally upright position;

said first fluid cylinder means being selectively extendable and retractable;

first beam means operably connected to said first fluid cylinder means for vertical movement relative to said platform in response to extension and retraction of said first fluid cylinder means;

first holding means for selectively coupling said first beam means against vertical movement relative to said leg wherein actuation of said first fluid cylinder means produces relative movement between said platform and said leg;

second fluid cylinder means carried by said platform vertically remote from said cross member at a location which is vertically spaced from said cross member so that said second fluid cylinder means is disposed in vertically spaced relation relative to said first fluid cylinder means;

said second fluid cylinder means being selectively extendable and retractable in reverse phase relation to said first fluid cylinder means;

second beam means operably connected to said second fluid cylinder means for vertical movement relative to said platform in response to extension and retraction of said second fluid cylinder means;

second holding means for selectively coupling said second beam means against vertical movement relative to said leg wherein actuation of said second fluid cylinder means produces relative movement between said platform and said leg;

said first and second holding means being operable to couple first and second beam means to said leg in alternative sequence; and

power transfer means operably connecting said cross member to said first and second fluid cylinder means to transfer lifting forces directly to said cross member from the one of said first and second fluid cylinder means whose associated beam means is uncoupled from said leg, to augment forces being applied to said platform by the other of said first and second fluid cylinder means.

4,007,915

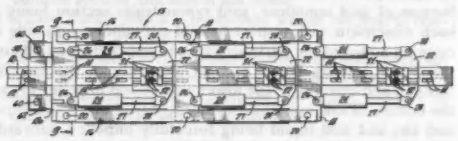
JACKING APPARATUS

Henry B. Chambers, Santa Inez, Calif., assignor to Hydranautics, Goleta, Calif.

Filed Dec. 15, 1975, Ser. No. 640,952

Int. Cl.² B66F *1/04*

U.S. Cl. 254—108 **7 Claims**



1. Jacking apparatus having a plurality of hydraulic cylinders arranged to move a load along a rail; in which the improvement comprises:

a. a rail having a plurality of pairs of vertical slots uniformly spaced along the length of said rail, said slots in each pair being transversely aligned;

b. a sled comprising a pair of spaced apart side members pivotably connected to a plurality of spaced apart cross members slidably mounted on said rail;

c. a plurality of cross heads slidably mounted on said rail, each of said cross heads being spaced apart from an adjacent sled cross member;

d. hydraulic cylinders pivotably attached between the outer ends of each of said cross heads and the said adjacent sled cross members;

e. a pair of transversely aligned latches having longitudinally bevelled bottom surfaces mounted in each of said cross heads so as to be vertically slidable and engageable with said slots in said rail;

f. means for maintaining said pair of latches in each of said cross heads in transverse alignment with said pairs of slots in said rail;

g. means for causing simultaneous alternate retraction and extension of the piston rods of said hydraulic cylinders, thereby to cause repetitive, incremental movement of said sled along said rail by engagement of said latches with said slots in said rail when said cross heads are moved by said hydraulic cylinders in one direction with respect to said sled, and sliding of the bevelled bottom edges of said latches over edges of said slots in said rail when said cross heads are moved by said hydraulic cylinders in the other direction with respect to said sled; and,

h. means on an end of said sled for engaging a load to be moved along said rail.

4,007,916

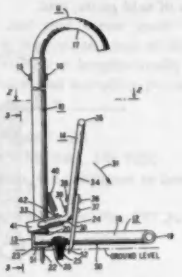
GARDENING TOOL

Billy G. Maples, 65 Dale Road, Middletown, N.J. 07748

Filed Mar. 22, 1976, Ser. No. 668,708

Int. Cl.² B66F *3/00*

U.S. Cl. 254—132 **9 Claims**



1. A gardening tool adapted both for hand and foot operation to extract undesired growths from soil comprising,

a downwardly positioned extendible caneshaped member having a curved portion suitable for a hand grip,

a lateral support affixed substantially perpendicular to said member near to the bottom thereof and forming a contiguous unit with said member,

engaging studs affixed below said lateral support adapted to penetrate said soil, and

a foot operated pivotally mounted pedal in a lower portion of said member having a downwardly posed detachable cutter affixed thereon.

4,007,917

STRUCTURES FOR ABSORBING IMPACT ENERGY

Burton D. Brubaker, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 449,146, March 7, 1974, abandoned. This application Sept. 4, 1975, Ser. No. 610,482

Int. Cl.² A01K *3/00*; E01F *15/00*

U.S. Cl. 256—13.1 **3 Claims**

1. A highway guardrail structure which is capable of absorbing the impact energy of a moving vehicle, the structure including:

a layer of a foam material which covers the guardrail structure and which is fastened to the structure;

the foam layer being defined by a rigid, inorganic, multicellular foam selected from the group consisting of ceramic foams or glass foams which have a density of from about 6 to 20 pounds per cubic foot and which have a flexural strength of from about 50 to 250 pounds per square inch.

4,007,918

PREFABRICATED FENCE

Isamu Matsubara, Nyuzen, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 17, 1975, Ser. No. 623,508

Claims priority, application Japan, Oct. 17, 1974, 49-125578

Int. Cl.² E04H *17/14*

U.S. Cl. 256—59 **9 Claims**

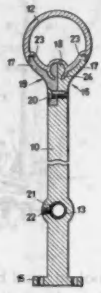
1. A prefabricated fence for installation on a parapet or like stationary base structure, comprising in combination:

a. at least two posts having means by which they can be fixedly mounted in spaced-apart positions on the base structure, each of said posts having its upper end shaped as a top-rail holding portion and having a hole extending horizontally through each said post at a point adjacent to its lower end;

b. a top rail having a uniform cross-sectional shape through-

out its length, said top rail having its underside shaped in conformity with said top-rail holding portion of each said post, the underside of said top rail having a sliding fit with said top-rail holding portions of said posts in a longitudinal direction;

c. a bottom rail of uniform original cross-sectional shape throughout its length, said bottom rail extending through said holes of said posts; and



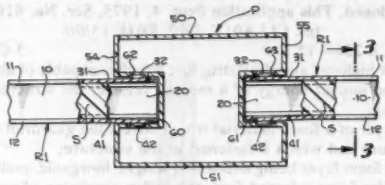
d. a plurality of balusters each having at its upper end a top-rail holding portion which is at least partially identical in cross-sectional shape and size with said top-rail holding portion of each said post, and having interfitting engagement with the underside of said top rail, each said baluster having at its lower end a bottom-rail holding portion fitting over said bottom rail.

4,007,919

FENCE STRUCTURE

Clyde D. Totten, 31557 1/2 Castaic Road, Castaic, Calif. 91310

Filed July 24, 1975, Ser. No. 598,685
Int. Cl.² B01F *13/00*
U.S. Cl. 256—59 **3 Claims**



1. A fence structure comprising:

a vertically disposed post having a vertically extending groove formed in one edge surface thereof and extending for substantially the length of said post, the configuration of said groove in the horizontal plane being substantially rectangular;

a plurality of horizontally disposed rails arranged in a vertical series, each of said rails being of substantially rectangular cross-sectional configuration both in the horizontal plane and in the vertical plane, one end of each of said rails extending into said post groove in abutting relationship therewith, said rails being hollow, the walls of said rails being made of plastic material, and a rigid plastic foam material filling the interiors of said rails and being bonded to the inner walls of said rails;

said post having a plurality of pairs of openings formed therein, on opposing sides of said groove, at least one pair of openings for each of said rails; and

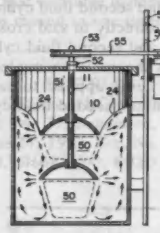
each of said rail ends having in its lateral walls a pair of laterally movable panels, each of said panels having an outwardly projecting ear which is received by a corresponding opening of said post groove.

4,007,920

MIXING AND AERATING DEVICE

Mark Plunguian, 6912 Columbia Drive, and Charles E. Cornwell, 7104 Marlan Drive, both of Alexandria, Va. 22307

Continuation-in-part of Ser. No. 392,643, Aug. 29, 1973, abandoned. This application Sept. 27, 1974, Ser. No. 509,940
Int. Cl.² B01F *7/16*
U.S. Cl. 259—108 **7 Claims**



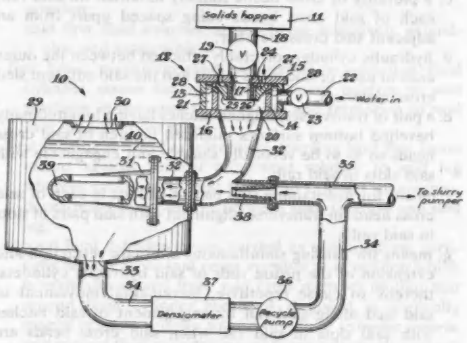
1. A mixing and aerating device comprising a mixing container containing liquid material to be mixed or aerated, a vertically extending shaft supported for vertical movement and adjustably fixed relative to container, drive means adapted to be attached to said shaft for rotating said shaft at high relative speed, at least one mixing impeller attached symmetrically centrally to said shaft, said impeller comprising an imperforated relatively thin-walled symmetrical closed concave surface of a hollow sphere, said concave surface being disposed downwardly with the open end facing the bottom of said container, said symmetrical section being of such dimension with respect to said container to provide an opening adjacent the periphery of said impeller and said container for leading liquid and air from above the impeller through and opening to the lower side of said impeller toward the bottom of said container to thoroughly intermix said liquid and air; and said liquid being forcefully impelled outwardly from the periphery of said impeller.

4,007,921

APPARATUS FOR MIXING DRY PARTICLES WITH A LIQUID

Warren M. Zingg, Tulsa, Okla., assignor to The Dow Chemical Company, Midland, Mich.

Filed Jan. 19, 1976, Ser. No. 650,091
Int. Cl.² B28C *5/06;* **B01F** *13/10*
U.S. Cl. 259—151 **7 Claims**



1. An apparatus for mixing dry particles with a liquid which comprises, in combination;

a hopper for storing a change of dry particles, which hopper includes a discharge outlet;

a first conduit section which communicates with the discharge outlet;

a disperser means, the disperser being defined by a main chamber, the chamber including a first vertical nozzle and a first compartment positioned below the first nozzle, the nozzle communicating with the first conduit section and with the first compartment, the chamber further including a second compartment which surrounds the first compartment and which communicates with the first compartment, a source of liquid connected to the second compartment, air inlet ports in said chamber, the chamber further including a vane member which is positioned adjacent to the second compartment and which includes an outer surface in communication with the first compartment, the vane member being spaced from the first nozzle with the space defining an air intake passage which commmunicates with the air inlet ports in the chamber;

the dry particles in the hopper being passed into the first compartment through the first nozzle, liquid received in the second compartment being passed into the first compartment to thereby mix with the particles and produce a slurry mixture;

a tank container which includes a vent opening therein;

a volute casing which is positioned in the tank container;

a second conduit section which connects the first compartment of the disperser with the volute casing;

the slurry mixture being delivered into the volute casing through the second conduit section, and circulated within the volute casing and within the tank container;

a third conduit section which connects the tank container with a fourth conduit section;

a pump means which is installed in the third conduit section;

the fourth conduit section being connected into the second conduit section and into a use point;

a second nozzle which is positioned within the fourth conduit section; wherein

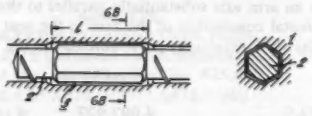
a portion of the slurry mixture is continuously circulated from the tank container through the pump means and second nozzle, and a portion of the slurry mixture is continuously delivered to the use point.

4,007,922

EXTRUDING DEVICE FOR HIGH MOLECULAR MATERIALS

Yukio Tamura, Obu, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 14, 1975, Ser. No. 567,839
Claims priority, application Japan, Apr. 15, 1974, 49-40952
Int. Cl.² B29B 1/10
U.S. Cl. 259—191 **8 Claims**



1. An extruding device, comprising:

a barrel having internal wall means defining a longitudinally elongated chamber;

a longitudinally elongated screw received in said barrel chamber with its sense of longitudinal elongation generally parallel to the sense of elongation of said barrel chamber, for angular rotation of said screw about said sense of longitudinal elongation of said screw;

said barrel chamber and said screw each having a longitudinally intermediate portion which longitudinally coextend with one another over at least a major part of the length of each such portion to provide a kneading portion of the extruding device;

said barrel chamber and said screw, within said kneading portion, each having a polygonal transverse cross-sectional figure, which may be respectively inscribed and circumscribed with respective imaginary circles of substantially the same diameter, so that each apex on the transverse cross-sectional figure of the screw within said kneading portion is alternately brought immediately radially adjacent and substantially radially spaced from said internal wall means of said barrel chamber as the screw is angularly rotated;

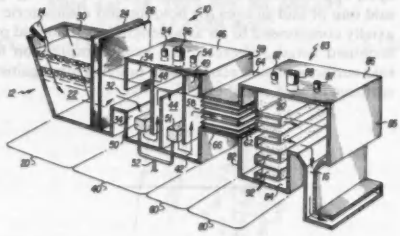
said barrel chamber and said screw each undergoing a substantial change in transverse cross-sectional shape at each end of each respective longitudinally intermediate portion which provides said kneading portion.

4,007,923

MOLTEN METAL FILTER

Enrique C. Chia, Carrollton, Ga., assignor to Southwire Company, Carrollton, Ga.

Filed July 18, 1975, Ser. No. 597,312
Int. Cl.² C21C 7/00
U.S. Cl. 266—217 **9 Claims**



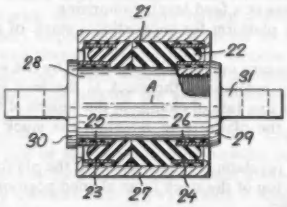
1. Apparatus for continuously treating molten aluminum and aluminum alloys to remove a substantial portion of solid particles and gases therefrom, comprising a chamber having an inlet for receiving a flow of molten aluminum to be purified and an outlet for discharging the purified molten aluminum, means dividing said chamber into a plurality of purifying stages including a deslagging stage having a filter medium adapted to be at least partly submerged in the molten metal, a fluxing stage including means for introducing a fluxing gas into the molten metal, an adsorption stage including means for adsorbing impurities from said molten metal, said adsorbing means comprising a plurality of spaced, planar refractory elements over which the molten metal flows and a filtration stage including a rigid filter medium for filtering solid impurities from the molten metal passing therethrough.

4,007,924

ELASTIC SUPPORT MOUNT

Raoul Jörn, Hengnau, and Georg Lang, Giessen, both of Germany, assignors to Raoul Jörn, Hengnau, Germany

Filed June 27, 1975, Ser. No. 590,857
Int. Cl.² F16F 1/38
U.S. Cl. 267—57.1 R **14 Claims**



1. An elastic mount for use between an outer member having an inner surface formed generally as a surface of revolution and an inner member in said outer member and having

an outer surface formed generally as a surface of revolution, said mount comprising:

a solid circumferentially continuous elastomeric body of revolution having an outer surface directly engageable against said inner surface of said outer member and an inner surface directly engageable against said outer surface of said inner member, said surfaces normally being coaxial, said body having an axially open end and having in unstressed condition a predetermined overall axial length;

an inner metal sleeve and an outer metal sleeve both formed as bodies of revolution coaxial with said surfaces and imbedded in said elastomeric body at said open end and respectively generally on said inner and outer surfaces of said elastomeric body, said sleeves having axial lengths equal to a fraction of said predetermined length of said body whereby the major part of the axial length of said body is free from such sleeves, at least one of said sleeves projecting at said end beyond the remainder of said body; and

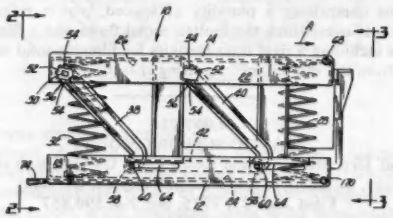
abutment means on at least one of said members acting upon opposite axial ends of said body and bearing against said one of said sleeves for holding said elastomeric body axially compressed to an axial length less than said predetermined length, whereby said axial compression forces said surfaces of said elastomeric body tightly against said surfaces of said members.

4,007,925

VERTICAL RISE SHEET FEEDER

Thomas Vernon DeRyke, Libertyville, and Willard James Holman, Barrington, both of Ill., assignors to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed Oct. 24, 1975, Ser. No. 625,595
Int. Cl.[2] B65H *1/08*
U.S. Cl. 271—160 **12 Claims**



1. A vertical rise sheet feeder for maintaining the top of a stack of sheets at a feed level, comprising:

a movable platform for supporting a stack of sheets to be fed;

stabilizer means operatively controlled by the weight of the stack for positioning the stack at the feed level and responsive to a rate of change in the weight of the stack for moving the platform to maintain the stack at the feed level;

means for regulating the movement of the platform to maintain the top of the stack in an aligned position at the feed level; and

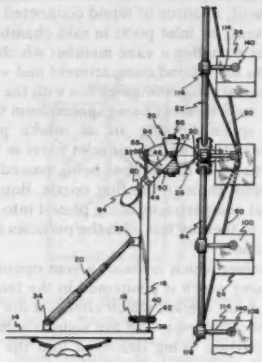
biasing means selectively adjustable between an inoperative position spaced from the movable platform and an operative position acting against the movable platform for urging the stack towards the feed level.

4,007,926

MOBILE AMUSEMENT RIDE

Herbert J. Ottaway, 3702 Elmwood Drive, Wichita, Kans. 67218

Filed Sept. 23, 1974, Ser. No. 508,160
Int. Cl.[2] A63G *1/40, 1/10*
U.S. Cl. 272—37 **6 Claims**



5. In an amusement ride of the type wherein a wheel that carries a plurality of passenger carrying units spaced about its periphery is mounted for powered rotation about its central axis, the improvement comprising a stationary and upstanding ground support having fixed thereto a gimbal means rotatably mounting therein an axle to which the wheel is fixedly secured with the axis acting as the central axis of the wheel for enabling both vertical tilting movement of the axle of the wheel between approximately horizontal and vertical positions and simultaneous limited horizontal turning movement of the axle in the gimbal means, said gimbal means being fixed to the support at a vertical height above ground that is greater than is the spacing of the passenger units from the axis of the wheel in an arrangement such that the lowermost of the passenger units is spaced above ground when the axle is horizontal, and a single power driven means fixed to the support at a position adjacent the gimbal means and operatively connected to said axle for driving the axle synchronously both to tilt vertically and to turn horizontally through a predetermined cyclic sequence, each of the passenger carrying units comprising a seat adapted to support a passenger seated thereon, and a seat supporting arm pivotally connected for free pivotal movement at spaced positions to both the wheel and the passenger seat, with the pivotal connection of the arm to the wheel being about an arm axis substantially parallel to the axle, and with the pivotal connection of the arm to the seat being about an axis that is substantially perpendicular to the arm axis.

4,007,927

INERTIAL CYCLE EXERCISER

Richard I. Proctor, 3201 Orange Grove Ave., North Highlands, Calif. 95660

Filed Oct. 28, 1975, Ser. No. 626,485
Int. Cl.[2] A63B *21/00*
U.S. Cl. 272—73 **2 Claims**

1. Inertial cycle exerciser comprising:

a. a stationary fore and aft frame on a supporting surface;

b. a handlebar mounted on the forward portion of said frame;

c. a seat mounted on the after portion of said frame;

d. a flywheel;

e. means for mounting said flywheel on the central portion of said frame for rotation of said flywheel above the supporting surface and in a median, vertical, fore and aft plane;

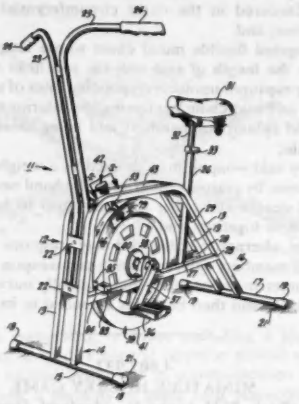
f. a pair of drive pedals connected to said flywheel;

g. a pair of pins mounted on said frame, said pins being symmetrically disposed on opposite sides of said flywheel and extending in a fore and aft direction;

h. a pair of caliper arms each including a substantially vertical brake lever and a substantially horizontal lever arm, each of said caliper arms being pivotally mounted on a respective one of said pins for movement in a transverse plane;

i. a pair of brake shoes each mounted on a respective one of said brake levers, said lever arms extending toward each other in overlapping relation and being formed with transverse overlapping slots respectively;

j. a substantially vertical stem translatably mounted on said frame;



k. a clevis pin connected to the lower end of said stem and slidably engaging in said slots, said stem extending through an opening in said frame;

l. a knob threaded onto the upper end of said stem for selective movement toward and away from said frame; and,

m. a compression spring disposed between said frame and said knob, said spring being effective to urge said stem and said clevis pin substantially upwardly and thereby pivot said caliper arms so as to urge said brake shoes into frictional engagement with said flywheel, the extent of frictional force exerted by said brake shoes being dependent upon the position of said knob relative to said frame.

4,007,928

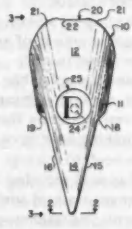
GOLFER'S COMBINATION TOOL

John J. Doubt, 2515 Carlmont Drive, Belmont, Calif. 94002

Filed Oct. 23, 1975, Ser. No. 625,069

Int. Cl.² A63B *57/00;* **A47J** *51/02*

U.S. Cl. 273—32 B **2 Claims**



1. A golfer's combination tool comprising:

an elongated thin member having an arcuate cross-section along the entire length;

one end of said elongated member being sufficiently wide and of a curvature to fit within the inside of a normal shoe and thereby serve as a shoe horn;

the other end of said elongated member having edges extending in the elongated direction converging to at least one point whereby said tool can be used a shoe horn by grasping the other end and sliding the one end into a shoe adjacent the heel and the tool can also be used to repair divots in the putting surface by grasping the one end and pushing the other end into the ground next to a divot and pivoting the tool relative to the ground; and

one end of the tool including an edge extending normal to the elongated length of a slight concave configuration such that by pushing the other end of the tool vertically into the ground a golf club handle can be rested on the concave end thereof and be maintained off the ground.

4,007,929

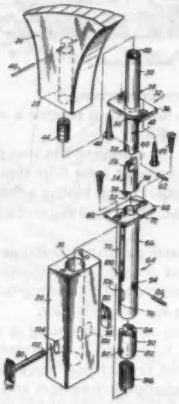
COLLAPSIBLE GAME RACKET

Rubin Figa, 100 Lawn Terrace, Mamaroneck, N.Y. 10543

Filed Apr. 18, 1975, Ser. No. 569,489

Int. Cl.² A63B *49/02*

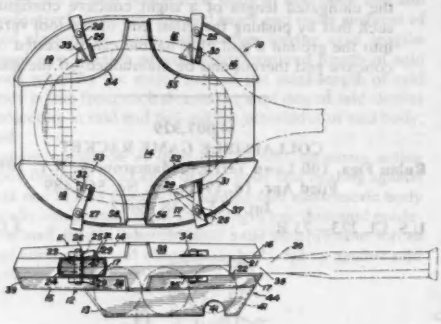
U.S. Cl. 273—73 R **5 Claims**



1. A collapsible racket for tennis or the like, comprising: a head portion having a frame terminating in a throat area; a handle portion having a gripping area at one end thereof; a male locking element positioned generally in said throat area and being generally axially disposed in one of said portions, said male locking element having an extending portion, said extending portion having a key transversely disposed across a distal end portion thereof, said key being a magnetic piece; a female locking element, which is mutually cooperatively associated with said male locking element, positioned generally in said throat area and being generally axially disposed in the other of said portions said female locking element having a first recess means interengageable with said extending portion, said female locking element having a female keyway element axially disposed in said first recess means and said female keyway element having means thereon operatively associated with pin means, which extend through said female keyway element, for limiting the axial movement of said female keyway element, said female keyway element having a keyway transverse of its top surface, said keyway facing toward said one of said portions, said keyway being engageable with said key for precluding rotational movement of said male locking element, said keyway being a magnetic piece; and biasing means being axially disposed in either said handle portion or said head portion, said biasing means constantly urging said head and handle portions together when said head and handle portions are interconnected together, and said biasing means constantly urging said female keyway element

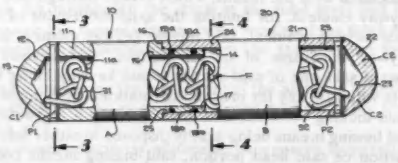
toward said one of said portions; whereby said head and handle portions are locked together as an assembled unit and whereby rotational and axial movements between said male and female locking elements are precluded.

4,007,930
CLAMP FOR TENNIS RACQUET
Albert E. Straus, 3740 Stirrup Drive, Erie, Pa. 16506
Filed Dec. 24, 1975, Ser. No. 644,072
Int. Cl.² A63B *49/16*
U.S. Cl. 273—74 **8 Claims**



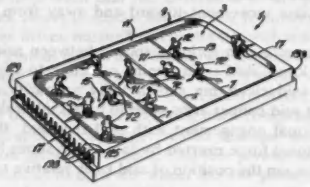
1. A racquet press comprising,
two similar parts adapted to receive a tennis racquet therebetween comprising,
clamping means for clamping the two parts together,
each said part having at least four symmetrically arranged clamping members, each having a flat surface disposed in a plane with the other said flat surfaces on the particular part,
each said part having a marginal flange disposed in an oval shape attached to the outer peripheral edges of said clamping members and extending toward the other said part providing torsional rigidity,
said flange having ends terminating in spaced relation providing a space for receiving the frame of a tennis racquet,
outwardly directed reinforcing flanges attached to the inner edges of said clamping members and an outer web member connected to the outer ends of said outwardly directed flanges,
said clamping means extending through said clamping members adapted to urge said clamping members toward each other whereby said clamping members are held in rigid clamp relation to a tennis racquet clamped therebetween, thereby providing full protection for the strings of said racquet.

4,007,931
HAND WEAPON
Horst W. Wich, 816 Brent, and James H. Ibrao, 1221 Monterey Road, both of South Pasadena, Calif. 91030
Filed Nov. 3, 1975, Ser. No. 628,573
Int. Cl.² F41B *15/10*
U.S. Cl. 273—84 **4 Claims**



1. A hand weapon comprising:
first and second generally cylindrical metallic members whose inner ends are slidably interengaged and whose outer ends are dome-shaped and substantially fully enclosed, said members except for said dome-shaped ends being of uniform diameter throughout their length, said diameter being such as to be conveniently grasped by hand, and each of said members being elongated whereby said members together form an elongated rod;
one of said cylindrical members having a relatively thin circumferential wall, the other member having a relatively thick circumferential wall whose inner end has a projecting interior flange portion that is slidably received within the inner end of said one member;
a pair of fastening pins, one within the outer end of each of said cylindrical members, each said pin extending transversely within the associated member and having its outer ends secured in the outer circumferential wall of the member; and
an elongated flexible metal chain whose length is at least twice the length of said rod, the end links of said chain being captured upon corresponding ones of said fastening pins, and said chain occupying the interior space of both of said cylindrical members and being loosely folded up therein;
whereby said weapon may be used as a weight for striking purposes by grasping same with one hand near its longitudinal center and using the hand grip to hold said two members together; and
whereby, alternatively, the user may grasp one of said cylindrical members only, and swing said weapon about so that the other member slides longitudinally outward and said flexible chain then becomes extended to its full length.

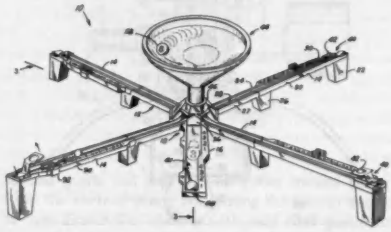
4,007,932
MINIATURE HOCKEY GAME
Robert LeBrun, 2231 Augier St., Montreal, Quebec, Canada
Filed Feb. 26, 1976, Ser. No. 661,707
Int. Cl.² A63F *9/14*
U.S. Cl. 273—85 F **12 Claims**



1. Miniature hockey game comprising:
a substantially horizontal playing surface and means imparting to said surface an orbital movement in the plane of said surface;
a plurality of miniature playing members unattachedly mounted over said playing surface to move thereover as said playing surface is subjected to said orbital movement, each member including:
steering means having a steering wheel, said steering means ensuring movement of said playing member in substantially one direction,
eccentric pivot means applicable against said surface to stop movement of said playing member in said one direction to permit spinning thereof,
coupling means joining said eccentric pivot means and said steering wheel to change the direction of said steering wheel as said member spins upon application of said pivot means on said surface,
resilient means acting on said steering wheel and on said pivot means to bias said steering wheel toward said playing surface and to bias said pivot means away from said playing surface, and
control means beneath said playing surface, operable from

either end thereof, selectively to cause application of said eccentric pivot means against said surface to allow reorientation of said steering wheel.

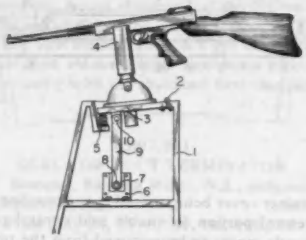
4,007,933
TIMING GAME
Julius Cooper, New Hyde Park, N.Y., assignor to Ideal Toy Corporation, Hollis, N.Y.
Filed Oct. 20, 1975, Ser. No. 623,839
Int. Cl.² A63F 9/14
U.S. Cl. 273—86 C **23 Claims**



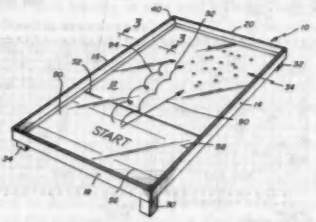
1. A game comprising, a frame including a plurality of ramps directed towards a central common station and a discharge chute located below and in communication with said common station; a plurality of game balls respectively associated with said ramps for movement therealong to said common station and into said discharge chute; said ramps each having a first end portion located adjacent said common station and a second end portion remote from said first end portion and at a higher elevation than said first end portion whereby said balls will roll down the ramps to said common station and into said discharge chute, said chute having a first end adjacent said common station and a second end remote from and at a lower elevation than its first end whereby said balls will roll down the discharge chute towards its second end in the sequence in which they arrive at said common station; a marker ball, and means located above said common station and the first end portion of said ramps and chute for allowing deposit of said marker ball into the common station from a position above the common station and said first end portions of the ramps and chute independently of said ramps.

4,007,934
APPARATUS FOR SIMULATING RECOIL IN AN IMITATION GUN
Shikanosuke Ochi, Tokyo, Japan, assignor to Kabushiki Kaisha Sega Enterprises, Tokyo, Japan
Filed Dec. 10, 1975, Ser. No. 639,610
Claims priority, application Japan, Sept. 19, 1975, 50-127820
Int. Cl.² A63F 9/02
U.S. Cl. 273—101.2 **1 Claim**

1. An apparatus for simulating recoil in an imitation gun, comprising a frame, an imitation gun mounted on said frame in a freely movable manner including up and down movement, an electric motor having a rotary shaft, an eccentric fixed on said shaft, coupling means coupled between said shaft and imitation gun through said eccentric for reciprocating said imitation gun up and down for each rotation of the shaft of said motor and a control circuit coupled between the trigger of said gun for rotating said motor when said trigger is actuated and continuing rotation of said motor while said trigger is maintained in the actuated position.



4,007,935
SPINNING TOP BOWLING GAME
Erwin-Walter C. Siber, 175 Stonehenge Drive, Beaconsfield, Quebec, Canada
Filed Apr. 30, 1975, Ser. No. 573,314
Int. Cl.² A63B 67/16
U.S. Cl. 273—108 **9 Claims**

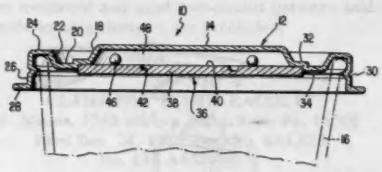


1. A bowling type of game played with pins and a spinning top comprising
a smooth playing board surface for standing the pins and on which the top may be spun,
superimposed arrays of nine and ten spots provided on the board surface denoting the nine pin and ten pin bowling arrangement for the pins,
a coding marked on certain of the spots in each array for establishing an eleven pin arrangement for pins on the board surface utilizing selected spots of the nine and ten spot arrays, and
a starting area marked on the board surface remote from the superimposed arrays denoting the region in which the spin of the top is to be initiated.

4,007,936
NOVELTY CLOSURE
James R. Hornsby, Jr., Orlando, Fla., assignor to Funstuf, Inc., Orlando, Fla.
Filed Apr. 9, 1975, Ser. No. 566,187
Int. Cl.² A63F 7/04
U.S. Cl. 273—115 **6 Claims**

1. A novelty closure comprising:
a container cover having a central portion, and puzzle means coupled with said cover at said central portion,
said puzzle means comprising
a planar member having indicia thereon and having depression means therein, and
ball means movably disposed upon said planar member,
said puzzle means being operative by manual manipulation

of said container cover to position said ball means in said depression means,



said container cover being scored in surrounding relation to said central portion to enable said central portion and said puzzle means to be removed from the remainder of said cover by manual rupturing along said scoring.

4,007,937

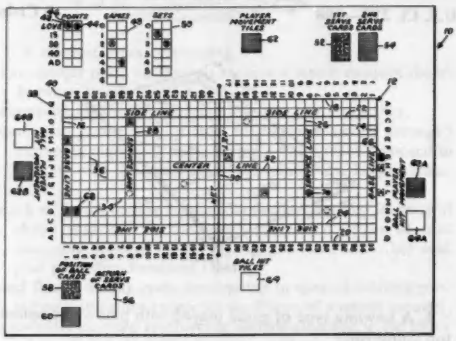
TENNIS GAME BOARD

Robert M. Casciano, and Donna R. Casciano, both of 214 Long Pond Road, Hewitt, N.J. 07421

Filed May 27, 1975, Ser. No. 581,429

Int. Cl.² A63F *3/00*

U.S. Cl. 273—134 CA **7 Claims**



1. A tennis game board comprising:
a rectangular tennis court area,
a net line across the center of said court area dividing said court into opposite sides,
a plurality of longitudinal and lateral boundary lines dividing said court area into playing and serving areas,
a plurality of equally spaced longitudinal and lateral grid lines dividing said court area into a plurality of like incremental rectangular areas,
coordinate markings along said grid lines to indicate successive individual incremental areas of said court,
a plurality of player markers to indicate the position of individual players with respect to the court area,
a ball marker to indicate the position of the ball on the court area,
a plurality of stacks of cards having indicia thereon selectively designating types of service and return of service of the ball by the players,
a stack of ball position cards having indicia thereon selectively directing movements of the returned served ball to designated incremental rectangular area positions on the court,
a stack of player movement tiles having indicia thereon selectively directing player movements to designated area positions on the court with respect to the position of the ball,
a stack of ball hit tiles selectively directing further ball movements to succeeding designated area positions on said court during continuing play following said movements of the returned served ball,
a plurality of scoring markers, and
means for indicating the scores of different players.

4,007,938

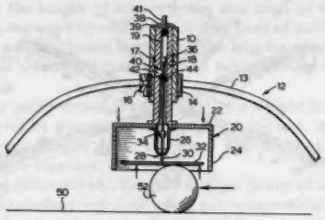
PUTTING DEVICE

Arthur William Edward Guenther, 2400 St. Frances Drive, Burlington, Ontario, Canada

Filed Nov. 7, 1975, Ser. No. 629,807

Int. Cl.² A63B *69/36*

U.S. Cl. 273—177 R **7 Claims**



1. A putting device comprising:
a vertically oriented cylinder;
means to mount the cylinder a predetermined distance above a horizontal surface;
a barrel vertically slidable axially in the cylinder and projecting at least from the lower end of the cylinder;
an inverted cup fixed on the projecting bottom end portion of the barrel;
a rod axially movable vertically in the barrel, the lower end of the rod projecting from the bottom of the barrel;
disc means fixed on the lower end of the rod; and
means to releasably detain the barrel in a raised position with the cup above the disc means and to release the barrel and drop the cup on vertical movement of the disc and upward vertical axial movement of the rod.

4,007,939

MECHANISM FOR SUPPORTING PICKUP ARM IN DISC RECORD PLAYER OF LINEAR TRACKING ARM TYPE

Motoi Iyeta, Hamakita, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed July 9, 1975, Ser. No. 594,557

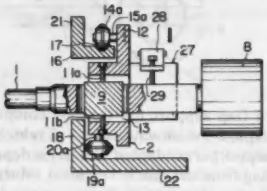
Claims priority, application Japan, July 14, 1974, 49-87861; July 25, 1974, 49-85320

Int. Cl.² G11B *3/10*

U.S. Cl. 274—23 A **5 Claims**

1. A pickup arm supporting mechanism for a linear tracking arm type disc record player comprising:
a first horizontally disposed guide rail and a second vertically disposed guide rail spaced vertically below said first guide rail with both said guide rails extending parallel to each other,
a pickup arm supporting frame, a pickup arm, means mounting said pickup arm on said supporting frame for vertical as well as horizontal swinging movements,
said pickup arm supporting frame having an upper portion

and a lower portion with said means mounting said pickup arm disposed between said upper and lower portions, said upper portion having horizontally extending shaft means and first roller means mounted for free rotation about a horizontal axis on said horizontal shaft means, said first roller means engaging said first guide rail for movement therealong with said supporting frame suspended from said first guide rail on said roller means about a horizontal pivot axis said lower portion having vertically extending shaft means and second roller means mounted for free rotation about a vertical axis on said vertical shaft means, and engaging said second guide rail for movement therealong, the line of engagement of the



second guide rail and second roller means being offset from the vertical plane containing the line of engagement of said first roller means with said first guide rail said supporting frame and pickup arm mounted thereon having a weight disposition relative to said first roller means such that a moment is created about the point of engagement of said first roller means with said first guide rail tending to urge said lower portion of said supporting frame toward said second guide rail to maintain contact between said second guide rail and said second roller means, and said second roller means engaging said second guide rail so that a horizontal force applied to said arm in a direction away from said frame urges said second roller means against said second guide rail.

4,007,940

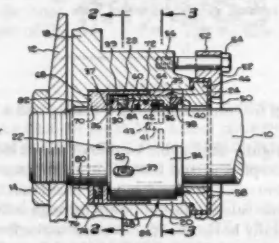
PROTECTED MECHANICAL SEAL

Roman Chapa, 4448 Fair St., Pico Rivera, Calif. 90660

Filed July 7, 1975, Ser. No. 593,629

Int. Cl.² F16K *41/00*

U.S. Cl. 277—32 **9 Claims**



1. In a mechanical seal assembly for a slurry pump or like shaft rotating in a housing subject to incursions of grit contaminants, relatively rotating first and second seal elements in annular egagement defining the seal, the first of said seal elements comprising telescopically interfitted inner and outer cylindrical members having seal-wear-responsive extensile movement to maintain sealing engagement with said second seal element, said g.it contaminants tending to work between said first element members and block their telescoping movement, the improvement of a third element comprising a rigid cylindrical shroud axially opposing and radially enclosing said first element concentrically, said shroud being cup-shaped having a relatively thick cross-section base and a relatively thin cross-section cylindrical wall, and means securing said first element inner member to said shaft for rotation therewith, and separate means securing said shroud to said shaft in inner member axially abutting relation free of radial engagement with said first element, to block grit contaminants from between said first element inner and outer members while commonly rotating with the shaft and first element.

4,007,941

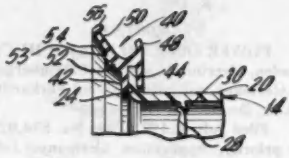
SEAL FOR DUCT TERMINATOR

Nicholas F. Stancati, Basking Ridge, N.J., assignor to ACTA Limited, Manville, N.J.

Filed July 24, 1975, Ser. No. 598,855

Int. Cl.² F16J *15/10*

U.S. Cl. 277—178 **6 Claims**



1. In combination with a duct terminator including a cylindrical conduit and having at one end a flared bell-mouth end portion, a flexible annular seal member of generally h-shaped cross-section and including first and second spaced apart leg portions which are respectively disposed on opposite axial sides of said flared bell-mouth end portion of the duct terminator, said first leg portion being disposed axially outwardly of said bell-mouth end portion, and a third leg portion extending radially outwardly and axially outwardly of said flared bell-mouth end portion of the duct terminator, said third leg portion extending from said first leg portion to an intermediate point thereof to define a first acute angle with respect to the center line of the cylindrical conduit, and then extending from said intermediate point to the distal end of said third leg to define a second acute angle with respect to the center line of the cylindrical conduit, with said second acute angle being greater than said first acute angle.

4,007,942

DEVICE FOR THE UPTAKE OF CUP-SHAPED PARTS OF GELATIN CAPSULES

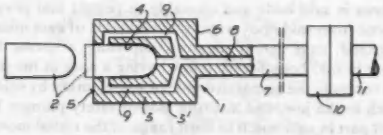
Harro Hofliger, Allmersbach, Taunus, Germany, assignor to Firma Allpack Industrielle Lohnverpackung GmbH & Co. KG, Waiblingen, Germany

Filed Oct. 21, 1975, Ser. No. 624,564

Claims priority, application Germany, Nov. 7, 1974, 2452779

Int. Cl.² B23B *5/22*; B25B *11/00*; B23B *5/14*

U.S. Cl. 279—3 **1 Claim**



1. A device for the uptake of cup-shaped elements, particularly capsule parts of gelatin capsules during manufacture thereof, said elements having a cylindrical body portion and a hemispherical end portion, comprising a holder adapted to rotate about its longitudinal axis, wherein said holder is a body

having an internal hollow chamber opening at one end to the exterior thereof, said holder including radially movable wall elements mounted within said chamber, said wall elements serving as a contact surface having a cylindrical portion and a hemispherical portion conforming to the shape of said elements, said holder further including resilient means for radially inwardly biassing said movable wall elements, said device further comprising channel means extending through said holder and communicating at least with said hemispherical portion of said contact surface, and means for connecting said channel means with either a source of underpressure or a source of overpressure.

4,007,943

POWER OPERABLE JAW CHUCK

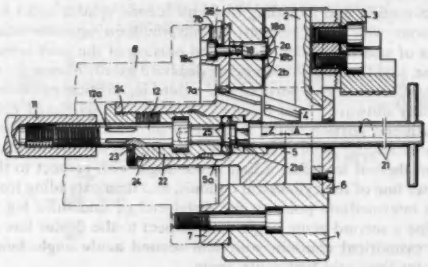
Hans Scharfen, Meerbusch, and Josef Steinberger, Dusseldorf, both of Germany, assignors to Paul Forkardt Kommanditgesellschaft, Dusseldorf, Germany

Filed July 8, 1975, Ser. No. 594,021

Claims priority, application Germany, July 29, 1974, 2436529

Int. Cl.² B23B 31/16

U.S. Cl. 279—121 **8 Claims**



1. A power operable chuck adapted for connection to a rotary spindle and comprising; a chuck body, chuck jaws guided for radial movement on said body, a jaw actuating piston receiprocable on the axis of said body, interengageable elements of cam means on said piston and jaws for positively moving the jaws radially on said body in response to reciprocation of said piston on the axis of said body, means for power actuating said piston in each direction of reciprocation thereof, means normally limiting the reciprocation of said piston to that range over which said elements of cam means are engaged, means selectively operable for moving said piston beyond said range to disengage said elements of cam means, means for holding said piston against rotation when said piston is beyond said range, and detent means holding said jaws in said body and operable to permit said jaws to be removed from said body when said elements of cam means are disengaged, said detent means comprising a spring loaded plunger in said body for each jaw having a nose at the jaw end and a recess in the respective jaw for engagement by said nose, a notch in the jaw, and a spring loaded safety plunger having an end part in said notch to limit range of the radial movement of the jaw on the body, an abutment element of the safety plunger, said abutment element engaging said piston and holding the piston against rotation when moved beyond said range having means responsive to movement of the piston beyond said range to retract the safety plunger from said notch.

4,007,944

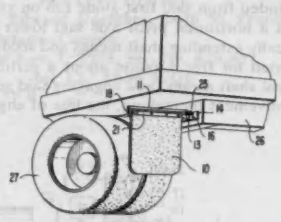
YIELDING SUPPORT FOR VEHICLE MUD FLAP

Jack L. Dingess, 1190 Manitoulin Pike, Brunswick, Ohio 44212

Filed Dec. 16, 1975, Ser. No. 641,263

Int. Cl.² B62D 25/16

U.S. Cl. 280—154.5 R **8 Claims**



1. A mud flap support for vehicles comprising a bracket element adapted for attachment to a vehicle near a wheel thereof, a support arm adapted to carry a depending mud flap and extending from the bracket element substantially horizontally during use, cooperating means on the bracket element and support arm forming a substantially vertical axis positive pivotal connection between said arm and bracket element, whereby the arm can swing fore and aft without separating from the bracket element, and opposing variable tension spring means on opposite sides of said arm and yieldingly interconnecting said arm with said bracket element.

4,007,945

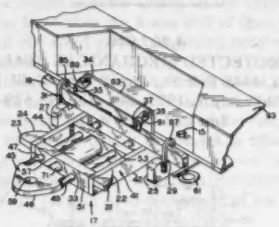
SWING-OUT SHOCK ABSORBING HITCH

Edward F. Casad, and Richard E. Jones, both of St. Marys, Ohio, assignors to Ajax Machine and Welding Company, St. Marys, Ohio

Filed Oct. 6, 1975, Ser. No. 619,586

Int. Cl.² B60D 1/16

U.S. Cl. 280—478 B **14 Claims**



1. A hitch for interconnecting a towing and a towed vehicle comprising:

a frame rigidly attachable to one of the vehicles;

a slide coupled to the frame for sliding movement therealong between first and second positions, the slide being pivotable relative to the frame through a limited range in a generally horizontal plane when in the first position and being adapted for coupling to the other of the vehicles;

means associated with the frame for substantially limiting pivotal movement of the slide when the slide is in the second position; and

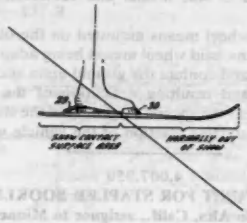
a gravity actuated latch for maintaining the slide in the second position including a generally horizontally disposed cross member for engaging both the slide and the frame when the slide is in the second position and pivotable parallelogram linkage support means interconnecting the cross member and the frame for allowing movement of the cross member between positions parallel to and displaced vertically from one another.

4,007,946

SHORT SKI

John Jeffery Sarver, 11 Carmel Bay Drive, Corona Del Mar, Calif. 92625

Filed Jan. 12, 1976, Ser. No. 648,140
Int. Cl.² A63C 5/00
U.S. Cl. 280—600 9 Claims



1. A pair of short skiis for use by a skier employing a skiing technique wherein the skier's weight during turning and traversing of the skis by the skier is disposed principally on the heels of the skier's feet with turning and/or checking being accomplished by the skier unweighting his toes and repositioning the ski tips in the new line of direction of the desired travel, each of said skis comprising:

a relatively rigid after-section and a forwardly projecting flexible forward section turned upwardly at its front extremity to form an upturned shovel, said after and forward sections being formed with downwardly-facing flat surfaces for shifting from side-to-side on the snow to facilitate turning of said ski;

the top and bottom surfaces of said ski tapering gradually and continuously inwardly toward one another from a relatively thick aft-end to a relatively thin forward end to form a bottom surface having a continuous contour from the aft to the forward end thereof, the lateral sides of said ski further tapering inwardly and rearwardly from a relatively wide shovel to a relatively narrow aft-end;

a boot location area on each said ski, said boot location area being so disposed with reference to the total running length of the ski that the ball of the boot is disposed at the approximate median of the overall ski's total length, said flexible forward section of the ski extending from the turned-up tip section rearwardly to approximately the median of said total running length; and

the total length of each ski being at least 90 centimeters and the aft-end of the boot location area is disposed so as to position the boot heel substantially 6 inches forward of the tail end of the ski.

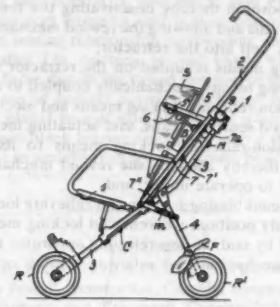
4,007,947

BABY CARRIAGE FOLDABLE IN WIDTH AND SHORTENABLE IN HEIGHT ALSO HAVING THE SEAT-BACK INCLINABLE IN VARIOUS POSITIONS

Giuseppe Perego, Arcore (Milan), Italy, assignor to Perego-Pines S.p.A., Italy

Filed Jan. 9, 1976, Ser. No. 647,815
Claims priority, application Italy, July 25, 1975, 25754/75
Int. Cl.² B62B 7/08
U.S. Cl. 280—642 4 Claims

1. A foldable baby carriage comprising, in combination, a pair of laterally spaced elongated handles; respective upper sleeve members slidable on said handles; a pair of elongated front legs having their upper ends secured to respective upper sleeve members; a pair of elongated rear legs each pivotally connected to an intermediate portion of a respective front leg; respective wheels on the lower ends of said front and rear legs; respective means interconnecting each rear leg to the lower end of the adjacent handle to move the rear legs toward the front legs when the carriage is folded and to maintain the rear legs extended when the carriage is erected; respective lower sleeve members slidable on the lower portions of said front legs; and X-frame formed by a pair of elongated arms pivotally interconnected intermediate their ends; a pair of laterally spaced upright elongated frame members having their lower ends pivotally connected to respective front legs intermediate the ends of the latter; respective adjusting means secured to the upper ends of said frame members and each adjustably engaged with a respective upper sleeve member, whereby said frame members are angularly adjustable relative to said handles; a carriage seat including a seat back secured at its side edges to said frame members for adjustment therewith and foldable about a longitudinal center line parallel to its side edges; each arm of said X-frame having its upper end pivotaly



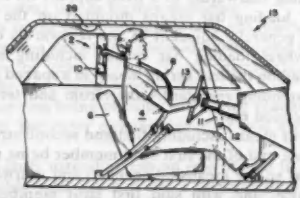
connected to the upper end of a respective frame member adjacent one handle and its lower end pivotally connected to the lower sleeve slidable on that front leg connected to the upper sleeve slidable on the other handle; operating means interconnecting the upper ends of said arms for conjoint displacement of the associated upper sleeve members along the respective handles to contract and expand said x-frame, with said lower sleeve members being displaced along the respective front legs, to selectively erect or collapse said foldable baby carriage; and releasable retaining means operatively interconnecting said adjusting means with the respective upper sleeve members to adjust the inclination of the seat back; whereby said seat back may be adjustably inclined and releasably retained in adjusted position.

4,007,948

RELEASE FOR SAFETY BELT TENSION-RELIEVING APPARATUS

Robert Larry Stephenson, Sterling Heights; Yogendra Singh Loomba, Washington, and William Robert Fox, Warren, all of Mich., assignors to Allied Chemical Corporation, Morris Township, N.J.

Continuation of Ser. No. 577,146, May 13, 1975, abandoned. This application Apr. 26, 1976, Ser. No. 680,610
Int. Cl.² B60R 21/10
U.S. Cl. 280—744 17 Claims



11. In a vehicle safety belt system adapted to restrain an occupant in a vehicle seat, the safety belt system including a

safety belt, a retractor having a rewind mechanism biased to rewind the safety belt on a reel of the retractor, a tension-relieving apparatus for relieving tension on the safety belt, the tension applied by the rewind mechanism of the retractor, the improvement of a release means for said tension-relieving apparatus, the release means comprising:

a sensing means disposed in said vehicle for operating said release means;

a tension-relieving locking means disposed on the retractor, the tension-relieving locking means having a ready position wherein said locking means may be operated by said tension-relieving apparatus and an unlocking position wherein the rewind mechanism is allowed to wind the safety belt into the retractor, said sensing means causing said tension-relieving locking means to move to its unlocking position thereby deactivating the tension-relieving apparatus and allowing the rewind mechanism to wind the safety belt into the retractor;

an actuating means mounted on the retractor adjacent to said locking means, mechanically coupled to a portion of said tension-relieving locking means and electrically coupled to said sensing means, said actuating means moving said tension-relieving locking means to its unlocking position thereby allowing the rewind mechanism of the retractor to operate under; and

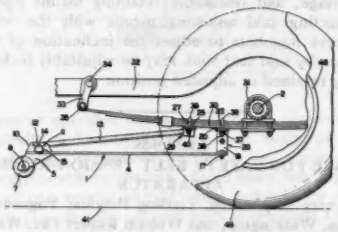
a biasing means biasing said tension-relieving locking means in its ready position, wherein said locking means may be operated by said tension relieving apparatus to block the rewind mechanism and relieving tension on the safety belt.

4,007,949

VEHICLE WHEEL LOADING BAR AND MOUNTING ARRANGEMENT

John A. Norcia, 2906 Susset St. NW., Canton, Ohio 44718, and Raymond E. Bickar, 2838 Saxon St. NE., Canton, Ohio 44721

Filed Nov. 25, 1975, Ser. No. 635,260
Int. Cl.² B60G *11/02*
U.S. Cl. 280—767 **16 Claims**



1. Vehicle wheel loading bar construction in combination with a leaf spring of a vehicle wheel assembly including:

a. a vehicle having a rear axle and at least a single wheel rotatably mounted on said axle;

b. leaf spring means operatively mounted on the axle and extending rearwardly to a fixed support on the vehicle;

c. wheel loading bar means mounted on the leaf spring means generally adjacent to and rearwardly of the axle;

d. the wheel loading bar means including strut means mounted on the leaf spring means in a spaced relationship and extending rearwardly therefrom and terminating in an extended end;

e. the strut means including first and second strut members with one end of the first strut member being mounted on the leaf spring means adjacent to and rearwardly of the rear axle, and with said first strut member extending generally parallel to the ground when the loading bar construction is in a static position;

f. one end of the second strut member being adjustably mounted on the leaf spring means and spaced rearwardly of said one end of the first strut member, with said second strut member extending in a downwardly rearwardly direction with respect to the leaf spring means;

g. the second strut member mounting means including a pair of angles pivotally mounted on said one end of the second strut member, a reinforcing clamping plate and U-bolt means, with the leaf spring means being clamped between said U-bolt means and reinforcing clamping plate; and

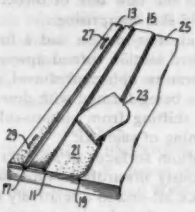
h. loading bar wheel means mounted on the other ends of the strut means, said wheel means being adapted to move downwardly and contact the ground upon acceleration of the vehicle and resulting deflection of the leaf spring means adjacent the spaced mounting of the strut means to increase the starting traction of the vehicle wheel.

4,007,950

BINDER UNIT FOR STAPLED BOOKLETS

Joe D. Giulie, Palo Alto, Calif., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed July 24, 1974, Ser. No. 491,618
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Int. Cl.² B42D *1/00*
U.S. Cl. 281—25 R **1 Claim**



1. A binding unit for a stack of paper having opposite first and second major surfaces and a spine edge surface around which said binding unit is attached, said binding unit comprising in combination:

a thin elongated generally rectangular flexible backing having an elongate edge, said backing having a first elongate portion adjacent said elongate edge contacting the first major surface of said stack of paper with the elongate edge of said backing positioned along the spine edge surface of the stack of paper;

a plurality of U-shaped staples through the stack of paper and the first portion of said backing, said staples having central portions along the second major surface of the stack of paper and having terminal ends clinched over the first portion of said backing;

an elongate strip of foam plastic corresponding in shape with the first portion of said backing and being adhered to the first portion of said backing on its surface opposite the stack of paper, said staples extending through said strip of foam plastic and said clinched over ends being embedded in said foam plastic, said strip of foam plastic having a thickness adapted to totally receive the clinched ends of the staples so that said ends do not extend above the foam plastic;

a second strip congruent to said first strip and lying over said strip of foam plastic and over the terminal ends of said staples on the side of said strip of foam plastic opposite said stack of paper;

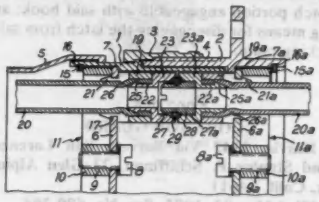
said backing member extending from said strip of foam plastic around said second strip and being adhered to the surface of the second strip opposite said strip of foam plastic, and extending from said second strip around the spine edge surface of said stack of paper and over at least a portion of the second major surface of said stack of paper and being adhered thereto to cover the central portion of said staples.

4,007,951

MULTI-WAY CONNECTOR FOR HYDRAULIC CONDUITS

Andre Legris, St-Maur, France, assignor to Ste Legris France S.A., France

Filed Aug. 15, 1974, Ser. No. 497,674
Claims priority, application France, Aug. 21, 1973, 73.30326
Int. Cl.² F16L 39/00
U.S. Cl. 285—137 R 12 Claims



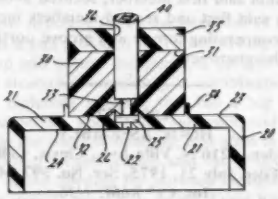
1. A multiple fluid line connector which comprises a pair of sockets disposed for releasable interconnection, a pair of frames each connected to a corresponding one of said sockets for support thereby, a pair of matching grid plates each releasably connected to a corresponding frame for support thereby, said grid plates having apertures receiving respective fluid line matching connector parts to support same with corresponding pairs of matching connector parts, one on each grid plate, positioned in alignment for interconnection, each of said connector parts being disposed for connection to a corresponding fluid line, each pair of matching connector parts, when interconnected, establishing a fluid flow connection between their associated fluid lines.

4,007,952

COMPACT MULTIPLE TUBE CONNECTOR APPARATUS

Theodore E. Fiddler, 1268 Suffield Drive, Birmingham, Mich. 48009

Filed Jan. 9, 1975, Ser. No. 539,575
Int. Cl.² F16L 39/00
U.S. Cl. 285—137 R 3 Claims



1. Apparatus for connecting a plurality of tubes to a member such as a control device, supply elements, supplied elements, other tubes, and the like, comprising,

a base plate of relatively non-elastic material having opposite top and bottom planar surfaces and ports leading between and opening through said planar surfaces;

a block of relatively elastic material having a top planar face, a bottom planar face, and counter-bored channels leading between and opening through said planar faces; said counter-bored channels having a relatively larger I.D. to receive a tube and a relatively smaller I.D. to communicate with said ports in said base plate:

said block bottom planar face being superposed on said top planar surface of said base plate with the smaller I.D. openings of said channels of said block aligned with said ports of said base plate:

a clamp bar overlying said top planar face of said block having tube receiving holes aligned with the openings of said channels at said top planar face of said block;

tubes inserted in said larger I.D. of said channels of said block through said holes in said clamp bar;

interconnecting clamping means on said clamp bar and said base plate forceably urging them toward one another to compress said block between said clamp bar and said base plate with said bottom planar face of said block at said smaller I.D. of said channels forced into sealing relationship with said top planar surface on said base plate to sealably connect said ports in said base plate with said channels and said tubes in said block, and

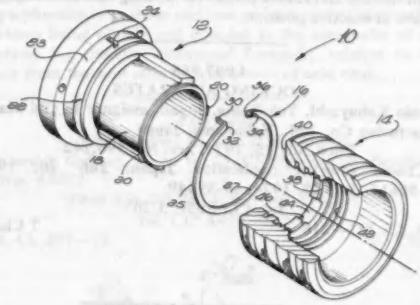
a raised bead on said top planar surface of said base plate surrounding each said port in said base plate; said beads surrounding the smaller I.D. opening of said channels through said bottom of said block; said raised bead at each said port engaging said bottom planar face of said block in sealing relationship surrounding each said channel smaller I.D. opening in said block with increased sealing force due to the raised position of said beads and small area of contact between each said bead and said bottom planar face of said block; said smaller I.D. opening of said block leaving said block with a strong mass of material to sealably engage said raised bead on said base plate.

4,007,953

REMOVABLE CAPTIVE COUPLING NUT ASSEMBLY

Lloyd James Powell, Newmarket, Canada, assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Sept. 10, 1975, Ser. No. 611,995
Int. Cl.² F16L 55/00, 37/08
U.S. Cl. 285—321 4 Claims



1. A removable captive coupling nut assembly comprising:

a coupling nut rotatably mounted on a barrel, said nut having a forward end;

means for captivating said nut axially on said barrel;

said captivating means including an annular groove in the outer surface of said barrel, an annular groove in the inner surface of said nut axially aligned with said barrel groove and a snap ring positioned in both said grooves;

said captivating means further including:

a recess in the inner surface of said nut intersecting said nut groove and opening at said forward end of said nut;

a slot in the outer surface of said barrel extending rearwardly from said barrel groove;

said snap ring being circular and having spaced free ends within the outer circumference of said circular snap ring;

a rearwardly extending tab on one of said free ends engageable with said slot and a forwardly extending tab on the other free end engageable with said recess whereby the nut is rotated to contract the snap ring for assembly and disassembly of the coupling nut and the

barrel, both of said tabs being positioned within said recess in the assembled position; and

said captivating means being releasable to allow removal of said nut from said barrel.

4,007,954

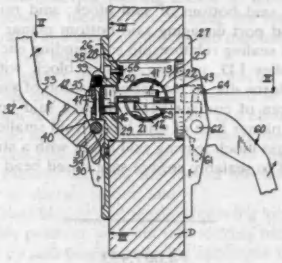
HOSPITAL LATCH

Lars Erickson, Clinton, Conn., assignor to Walter Kidde & Company, Inc., Belleville, N.J.

Filed Nov. 10, 1975, Ser. No. 630,368

Int. Cl.² E05F *15/20*

U.S. Cl. 292—165 **6 Claims**



1. In a latch bolt mechanism of the push-pull type for fire doors, said mechanism having a latch bolt slidable in a housing and handle actuated cams engageable with the bolt for retraction thereof upon actuation of either handle, a lever pivotally supported at one end and having its other end adapted to engage the push handle cam to prevent bolt retracting movement thereof and fusible means for holding said cam engaging means in inactive position.

4,007,955

LOCKING APPARATUS

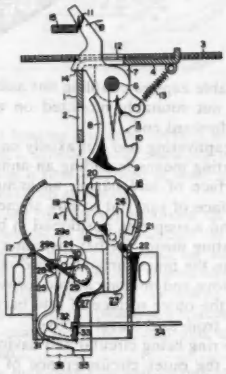
Fumio Kobayashi, Yokohama, Japan, assignor to Ohi Manufacturing Co., Ltd., Yokohama, Japan

Filed July 15, 1975, Ser. No. 596,142

Claims priority, application Japan, July 20, 1974, 49-86614; July 29, 1974, 49-89449

Int. Cl.² E05C *3/26*

U.S. Cl. 292—216 **7 Claims**



1. A locking apparatus for a trunk lid of a motor vehicle or the like comprising:

a striker rigidly mounted on the underside of a trunk lid for movement therewith, said striker including a lower aperture portion;

a locking plate pivotally mounted on said striker, said locking plate including a hook opposite said striker;

a body fixed in the path of movement of said striker;

a latch pivotally mounted on said body, said latch having an engagement member at one side for engagement by said striker for pivoting said latch, said latch having a notch portion, spaced from said engagement member for sequential receipt in the lower aperture portion of said striker after the striker has engaged said engagement member of said latch, said latch having a flange opposite said notch portion engageable with said hook; and

unlatching means for disengaging the latch from said striker and locking plate.

4,007,956

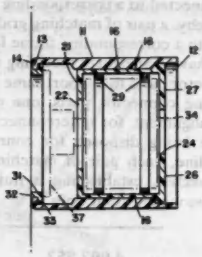
DOORKNOB GUARD

Steven K. Harris, 2142 Via Barrett, San Lorenzo, Calif. 94980, and Stanley P. Schiffman, 22 Glen Alpine Road, Piedmont, Calif. 94611

Filed May 23, 1975, Ser. No. 580,294

Int. Cl.² E05C *19/18*

U.S. Cl. 292—347 **7 Claims**



1. A door knob protective device, comprising a first member secured about a door knob, said first member being formed of rigid, non-compressible material, and friction means disposed within said first member and about said door knob for transmitting a limited and unincreasable amount of torque therebetween, said friction means including a second member, within said first member, secured about said knob, and wherein said first and second members include at least one pair of cooperating torque and groove portions to transmit torque therebetween.

4,007,957

HOOK ASSEMBLY

Mack L. Roden, 5210 N. Villa Ave., Clovis, Calif. 93612

Filed July 21, 1975, Ser. No. 597,945

Int. Cl.² B66C *1/36*

U.S. Cl. 294—82 R **3 Claims**

1. A hook assembly for dependably secure interconnection of a means of support and a work load, the assembly comprising a housing having a substantially cylindrical side wall with an integral end wall and an opposite open end; means extending through the end wall for mounting the housing on the means of support for rotation about an axis substantially coaxial with the cylindrical side wall; a hook having a load-supporting portion disposed in a reference plane and an integral eye portion defining a pivotal axis in said plane; a shaft mounted on the side wall extending through the eye portion of the hook and the housing in substantially right-angular relation to the axis of the mounting means to mount said load-supporting portion of the hook for pivotal movement on the shaft laterally from a normal position in which said plane of the load-supporting portion coincides with the axis of the mounting means; a radial flange borne by the housing having a semi-circular surface substantially concentric to the axis of the mounting means; and a guide mounted on the load-supporting portion of

the hook substantially normal to the plane thereof and having a semi-circular surface juxtaposed the semi-circular surface of

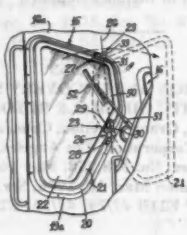
the flange when the hook is in the normal position to capture a work load supported on said load-supporting portion.

4,007,958

PIVOTED WINDOW FOR CAB OF MOTOR VEHICLE

Gary S. Peifer, Waynesville, and David D. Shulke, Decatur, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 9, 1975, Ser. No. 566,561
Int. Cl.² B62D *25/00*
U.S. Cl. 296—28 C **5 Claims**



1. A window structure for an enclosed cab of a motor vehicle which has a wall provided with a window opening that has transverse top and bottom margins and upright side margins, said window structure comprising, in combination:

a window including a frame that has a top cross bar, a bottom cross bar, and upright side bars, said frame fitting loosely in the window opening, and glass in said frame;

top and bottom hinges outside said cab which mount said window in the opening for outward swinging movement about an upright pivot axis, each of said hinges having a first bracket secured in abutting relationship to an upright outer surface of the cab wall immediately adjacent to the window opening, one of said first brackets having an integral split collar with opposed arcuate surfaces on said one of said first brackets and on the free end of the split collar, said opposed arcuate surfaces defining a socket, each of said hinges also having a second bracket secured to the outer surface of one of said frame bars, and a hinge pin integral with one of said second brackets and rotatable in said socket;

a shaft which is journalled in a hole in the cab wall, said shaft having a threaded outer end portion which is screwed into a threaded hole in the free end portion of the split collar so that rotation of said shaft flexes said split collar to selectively clamp or release the hinge pin, there being a handle on the inner end of said shaft for rotation thereof from inside the cab;

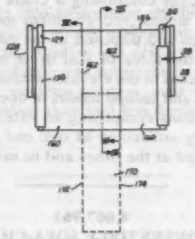
and sealing means for sealing said window in the opening when it is closed.

4,007,959

WHEELCHAIR

Eugene H. Juergens W75 N758 Tower Ave. Cedarburg, Wis. 53012

Filed July 7, 1975, Ser. No. 593,846
Int. Cl.² A47C *4/00*
U.S. Cl. 297—42 **7 Claims**



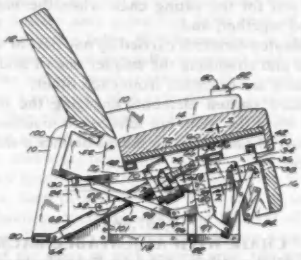
1. An improved laterally collapsible wheelchair having left and right side structures including vertical and horizontal support members, each of said side structures provided with rotatably mounted rear wheels and forwardly mounted caster wheel assemblies, said wheelchair including an upper, foldable elongated horizontal support structures interconnecting said left and right side structures, and interpivoted elongated members, each said elongate member being pivotally connected at one end to a lower portion of one of said side structures and pivotally connected at the opposite end to the foldable support structure adjacent the other of said side structures, said interpivoted elongate members lying in a vertical plane forwardly of the vertical plane in which said caster wheel assemblies are disposed, seat structure coupled to said side structures and extending therebetween, said seat structure including a plurality of cushion sections, at least one of said cushion sections being pliable and coupled to the remainder of said sections for slidable withdrawal forwardly relative to said chair from the seat structure by a user of said chair.

4,007,960

RECLINING ELEVATOR CHAIR

Edward J. Gaffney, N. 26 W. 27293 Highway SS, Pewaukee, Wis. 53072

Filed Apr. 30, 1975, Ser. No. 573,209
Int. Cl.² A47C *1/02*
U.S. Cl. 297—71 **23 Claims**



1. In a reclining chair having a frame, a back portion, a seat portion, a leg rest portion, recliner actuator means including means for swinging said back portion between an upright and a reclined position and means for moving said leg rest portion between an extended and a retracted position, the improvement comprising elevator means for raising said seat and simultaneously tilting said seat forwardly to assist exit from said chair, and power-actuated drive means common to both the recliner actuator means and the elevator means for sequentially actuating both the recliner actuator means and the

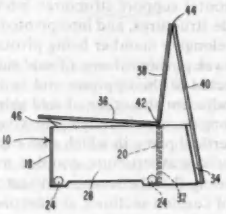
elevator means and being operable sequentially in a first mode of operation to drive the recliner actuator means to swing said back portion between its upright and reclined positions and to simultaneously move said leg rest between its retracted and extended positions while said seat is in its lowered position, and operable in a second mode of operation to drive the elevator means to raise and tilt said seat forwardly, said power actuator drive means comprising a crank connected to said recliner actuator means, and abutment means connected to the elevator means and disposed in the path of crank movement to transfer the force of said drive means from the recliner actuator means to the elevator means at a transfer point between said first and second modes of operation, said power-actuated drive means comprising an extendible and retractable ram pivotally connected at one end to said frame and pivotally connected at the other end to said crank.

4,007,961

CONVERTIBLE SOFA-CHAIR

Tarsis Octavio Costa, Dr. Oliveira 1093, Theresopolis, R. J., Brazil

Filed Oct. 23, 1975, Ser. No. 625,066
Claims priority, application Brazil, Oct. 25, 1974, 8965
Int. Cl.² A47C *13/00*
U.S. Cl. 297—111 **7 Claims**



1. In a convertible sofa, chair or the like, the combination comprising

a pair of generally hollow bases disposed in spaced relation to each other,

platform means overlying both of said bases to define a sleeping bed,

one of said bases being smaller than the other of said bases permitting a telescoping arrangement therebetween whereby the sleeping bed may be converted into a sitting chair,

hinge means pivoting parts of said platform means into a back rest for the sitting chair when the bases are telescoped together, and

spaced slanted elements carried by one part of said platform means and straddling the smaller one of said bases when the bases are extended from each other,

said spaced slanted elements engaging the other of said bases when the bases are telescoped together so that the one part of said platform means defines a slanted seating surface.

4,007,962

CHAIR WITH ADJUSTABLE BACK

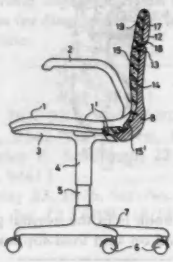
Wolfgang Müller-Deisig, Schieder-Schwalenberg, Germany, assignor to Fehlbaum, Basel, Switzerland

Filed Jan. 5, 1976, Ser. No. 646,737
Claims priority, application Switzerland, Jan. 10, 1975, 247/75
Int. Cl.² A47C *3/00*
U.S. Cl. 297—306 **4 Claims**

1. A chair having an adjustable back with means for the ergonomically correct support of the chair occupant's spine, comprising:

a vertically adjustable seat having a rounded buttocks support and formed with a cut-out section which is located in the centre of the rounded buttocks support and is of width about ¼ – ⅓ that of the chair seat;

a back support which is pivotally mounted with respect to the chair seat so that it can tilt forwards and backwards and so that a lower portion of the back support is fitted in said cut-out section so that it practically fills the cut-out section, the back support having vertical contours defining a surface which corresponds to the natural position of the human spine; and



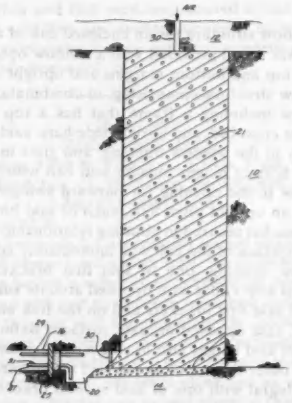
a shoulder support which is pivotally mounted with respect to the back support and which is formed with a cut-out section opening downwards, the back support having an upper portion which is fitted in the cut-out section of the shoulder support, the width of the cut-out section of the shoulder support being at least equal to the width of the upper portion of the back support.

4,007,963

OIL COLLECTION AND RECOVERY SYSTEM FOR IN SITU OIL SHALE RETORT

Richard D. Ridley, Grand Junction, Colo., assignor to Occidental Petroleum Corporation, Los Angeles, Calif.

Continuation of Ser. No. 578,258, May 16, 1975, abandoned.
This application Mar. 30, 1976, Ser. No. 671,957
Int. Cl.² E21B *43/24, 43/26;* E21C *41/10*
U.S. Cl. 299—2 **16 Claims**



1. An in situ oil shale retort in a subterranean oil shale formation containing a volume of fragmented oil shale and having an access tunnel at the bottom of the in situ retort, which comprises:

a gas-tight bulkhead means in the access tunnel for providing a sealed space connected to the bottom of the in situ retort;

a sump in said sealed space for collecting liquids from the in situ retort;

at least one trench extending from at least one low point in the bottom of the in situ retort to said sump for directing liquid from the bottom of the in situ retort into said sump;

a conduit extending through said bulkhead means and into said sump for withdrawing liquids from said sump; and

a conduit extending through said bulkhead means and into the sealed space with an opening above the sump for removing gas from the in situ retort.

8. A method of forming an in situ oil shale retort containing a volume of fragmented oil shale in a subterranean oil shale formation comprising the steps of:

excavating subterranean formation to form an access tunnel to a lower portion of the in situ oil shale retort being formed;

excavating subterranean formation to form an excavated region in communication with the access tunnel at the lower portion of the in situ oil shale retort being formed;

excavating subterranean formation to form a pump in the floor of the access tunnel outside of the excavated region;

forming at least one trench in the floor of the excavated region extending from a low area in the floor to the sump, such a trench sloping downwardly toward the sump; and

blasting subterranean oil shale formation from above the excavated region toward the excavated region to form a volume of fragmented oil shale in the in situ oil shale retort being formed.

4,007,964

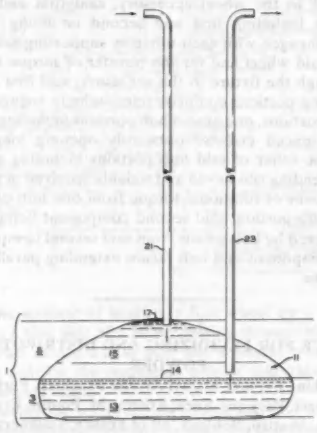
PREFERENTIAL SOLUTION MINING PROCESS

Elmar L. Goldsmith, Regina, Canada, assignor to PPG Industries Canada Ltd., Regina, Canada

Filed Sept. 23, 1975, Ser. No. 616,101

Int. Cl.² E21B *43/28*

U.S. Cl. 299—4 **22 Claims**



1. In a method of solution mining chloride salt from a stratified subterranean deposit of at least two chloride salts wherein the ratio of the chloride salts to each other varies between strata within the deposit which method comprises establishing a solution mining cavity in said deposit, feeding aqueous solvent into the solution mining cavity thereby dissolving chloride salts from the deposit to form a first aqueous working solution within the cavity, mining upwardly through said deposit, and withdrawing first working solution as an aqueous effluent from the cavity, the improvement comprising:

feeding aqueous solvent into said cavity and withdrawing first aqueous working solution effluent from said cavity until a preferentially minable higher zone having a different ratio of chloride salts than the layer subjacent thereto is reached;

injecting aqueous solvent having a density less than the density of said first aqueous working solution into the cavity above the surface of said aqueous working solution and above the bottom of the zone being preferentially mined;

dissolving chloride salts from the higher zone into said less dense aqueous solvent whereby to establish a layer of a second aqueous working solution; and

withdrawing effluent from the second aqueous working solution within said cavity near the bottom of the zone being preferentially mined, while maintaining said second aqueous working solution less dense than said first aqueous working solution and substantially undiluted by said first aqueous working solution, said effluent having a higher salt content than said less dense aqueous solvent.

4,007,965

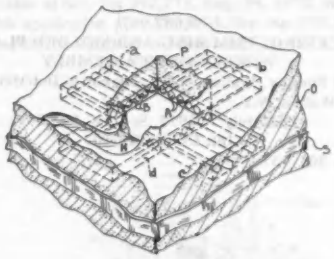
METHOD OF RECOVERING USEFUL MINERALS FROM SUBTERRANEAN DEPOSITS THEREOF

Anthony J. Shuttle, Jr., 839 Rydal Road, Jenkintown, Pa. 19046

Filed July 18, 1975, Ser. No. 597,004

Int. Cl.² E21C *27/20, 41/00*

U.S. Cl. 299—11 **1 Claim**



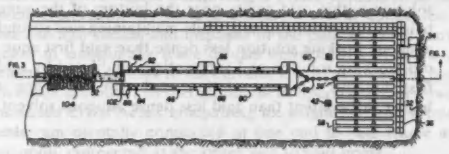
1. The method of recovering minerals from a subterranean substantially horizontal seam thereof underlying an overburden layer, the steps of excavating in the overburden layer a pit exposing at its bottom a substantially square area of the mineral seam, recovering the mineral from the seam in said area, then projecting from each side of said area an extraction operation removing mineral of the seam into said pit from a substantially square area extending from each of said sides under the overburden layer, then excavating in the overburden layer another pit substantially congruent with said first pit exposing at its bottom another substantially square area of the mineral seam having one side extending in prolongation of a side of said first area, said second area extending oppositely from said first aren in respect to the line common to said sides of said areas, said areas being spaced apart along said common line a distance approximately equal to each of the several sides of said areas, then projecting from each side of said second area an extraction operation removing mineral of the seam into said second pit from a substantially square area extending from each of the sides of said second area, the area of such removal extending from one of the sides of the second pit into substantial encounter with two of the extraction areas projected from adjacent sides of said first pit, then excavating similar square pits and areas under the overburden extending from the sides of each of said pits into the seam in like manner until extraction of the mineral of the seam has been substantially completed and after extraction of the mineral of the seam to said pits removing the mineral from said pits and finally returning to the pits overburden excavated therefrom to restore the surface substantially to the condition existing before the initiation of the mining operation.

4,007,966

SINGLE-ENTRY MINING DEVELOPMENT SYSTEM

William Zorn Wenneborg, Thousand Oaks, Calif., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Dec. 29, 1975, Ser. No. 644,585
Int. Cl.² E21C *41/00*
U.S. Cl. 299—11 **9 Claims**



1. A method of developing a single-entry for use in longwall mining comprising the steps of:
   a. advancing the working face of the entry;
   b. dividing said entry lengthwise by means of a continuous upstanding wall formed in progressive increments in following spaced relation to said face as it is advanced, said wall being adapted to provide load bearing support and air isolation between the two sides thereof; and
   c. directing air flow from the leading edge of said wall to said face during the mining of said entry.

4,007,967

LOCKRING, TRIM RING AND MOLDED PLASTIC WHEEL COVER ASSEMBLY

Herbert Buerger, Walton, N.Y., assignor to Del-Met Corporation, Walton, N.Y.

Filed July 7, 1975, Ser. No. 593,779
Int. Cl.² B60B *7/04*
U.S. Cl. 301—37 P **6 Claims**

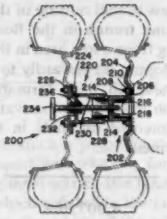
1. A lockring made from a flat straight strip of metal, and comprising a band of metal formed with transverse notches opening to one edge of the band and providing spring fingers between the notches, and also provided with transverse equiangularly spaced crimps increasing in depth toward the opposite edge of the band to cause said straight strip to curve into a circular band shape, the portions of the band between the crimps being in a common flat plane of said flat strip, the ends of said strip being overlapped and attached together to hold said crimped strip in circular band shape, a trim ring having a flange in a flat plane contacting said flat portions of said lockring, a plastic wheel cover having a flange in a flat plane contacting the flange of said trim ring, and means to attach said flanges of said trim ring and wheel cover to said flat portions of said lockring, said spring fingers being bent to one side of the plane of said flat portions, and said crimps extending to an opposite side of said plane of said flat portions, alternates of said spring fingers being bent to different angles relative to said flat portions.

4,007,968

VEHICLE WHEEL ACCESSORY MOUNTING FIXTURE AND REMOVABLE ACCESSORIES THEREFOR

Cruz Luevano Solis, 1204 Buena Vista, San Antonio, Tex. 78207

Continuation-in-part of Ser. No. 329,442, Feb. 5, 1973, Pat. No. 3,860,297. This application Dec. 3, 1974, Ser. No. 529,032
Int. Cl.² B60B *15/26*
U.S. Cl. 301—38 R **2 Claims**



1. A wheel accessory and mounting fixture therefor, said fixture comprising a first component including means for removable semi-permanent securement to a mounting vehicle wheel in the central portion of the latter, and a second component affixed to the wheel accessory, said first and second components including first and second co-acting portions releasably engaged with each other by supporting said accessory from said wheel and for the transfer of torque from the wheel through the fixture to the accessory; said first and second co-acting portions comprise telescopingly engaged cylindrical hub portions, one of said hub portions including circumferentially spaced endwise outwardly opening longitudinal slots and the other of said hub portions including generally radially extending ribs keyed and slidably received in said slots for the transfer of rotational torque from one hub portion to the other hub portion, said second component being threadably connected by bolt means from said second component to said first component said bolt means extending parallel to the slots and ribs.

4,007,969

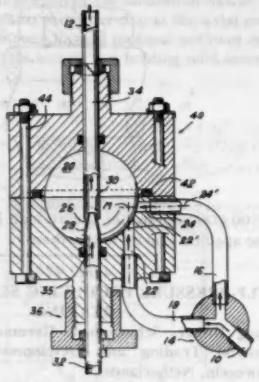
DEVICE FOR FLUIDIZING AND DISTRIBUTING POWDER

Gerard Aubin, Evreux; Michel Arsène Braguier, Paris; Christian Naturel, Pacy-sur-Eure; Etienne M. Poulin, Evreux, and Joseph A. Wattre, Bobigny, all of France, assignors to Letat Francais represente par le Ministre des Postes et Telecommunications, Moulineaux and Desmarquest et C.E.C. S.A., Montrouge, both of, France

Filed July 14, 1975, Ser. No. 595,356
Claims priority, application France, July 16, 1974, 74.24702
Int. Cl.² B65G *53/28*
U.S. Cl. 302—25 **3 Claims**

1. A device for fluidizing and distributing a powder in suspension in a carrier gas comprising:
   an enclosed cornerless chamber having an inner wall and a center;
   inlet conduit means for feeding a powder to be fluidized into said chamber;
   separating means dividing said inlet conduit into two pipes communicating with said chamber, said pipes having axes which converge to a point in the vicinity of said wall; and

outlet conduit means for distributing said powder once fluidized, said outlet conduit means having an opening



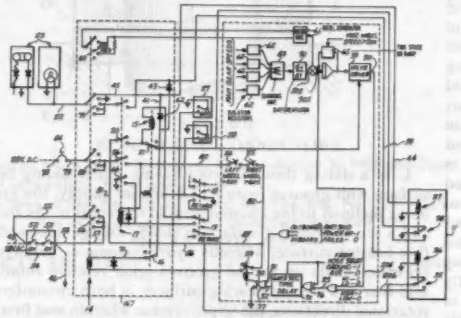
communicating with said chamber, and said opening being located in the vicinity of said center of said chamber.

4,007,970

AIRCRAFT AUTOMATIC BRAKING SYSTEM

Ervin Gordon Romero, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Sept. 30, 1975, Ser. No. 618,190
Int. Cl.² B60T *8/02*
U.S. Cl. 303—93 4 Claims



1. The method of braking a first wheel on a main landing gear on a first side of a plane passing through the fuselage of an aircraft having a nose gear and a second wheel on a main landing gear on the remaining side of said plane comprising the following steps:

measuring the wheel speeds of said first and second wheels;

applying braking pressure to said first and second wheels at an increasing rate of less than a predetermined value after said wheel speeds of said first and second wheels exceed a predetermined wheel spaced value;

measuring the wheel speed of a wheel on said nose gear of the aircraft;

applying braking pressure to said first and second wheels at an increasing rate of less than a further predetermined value after said wheelspeed of said wheel on the nose gear of the aircraft exceeds a predetermined value until the rate of deceleration of said aircraft equals a predetermined rate of deceleration, said further predetermined value being greater than said increasing rate of less than a predetermined value; and then,

adjusting braking pressure to said first and second wheels to maintain constant said predetermined rate of deceleration of said aircraft.

2. In combination of an aircraft, an automatic braking system having system arming and disarming switching means for automatically controlling the application of braking pressure to a plurality of wheels of the aircraft upon touchdown of the aircraft:

nose gear squat switch means for providing a signal representative of aircraft status with respect to the ground;

first circuit means for providing a first time delay having a first predetermined value when said signal representative of aircraft status is indicative of an air mode, and a second time delay having a second predetermined value less than said first predetermined value when said signal representative of aircraft status is indicative of a ground mode; and,

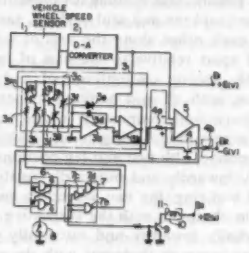
seond circuit means coupled between said first circut means and said system arming and disarming switching means for disarming said automatic braking system upon the occurrence of said first time delay and permitting disarming of said automatic braking system upon the occurrence of said second time delay.

4,007,971

ANTI-SKID CONTROL SYSTEM FOR VEHICLES

Akio Sugiura, Nagoya; Atutoshi Okamoto, Toyohashi; Takahiro Nogami, Susono, and Jun Ohta, Toyota, all of Japan, assignors to Nippondenso Co., Ltd., Kariya and Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, both of, Japan

Continuation of Ser. No. 392,775, Aug. 29, 1973, abandoned.
This application Apr. 28, 1975, Ser. No. 572,298
Claims priority, application Japan, Aug. 31, 1972, 47-87279
Int. Cl.² B60T *8/10*
U.S. Cl. 303—109 8 Claims



1. An anti-skid control system for vehicles comprising:

a wheel sensor for detecting a wheel speed,

a reference wheel speed generating circuit for producing a reference wheel speed signal which decreases in accordance with a predetermined control pattern to approximate a vehicle body speed during a braking action and which is derived from a wheel speed signal generated by said wheel sensor,

comparison means for generating a relaxation signal when a difference between said wheel speed signal and reference signal reaches a set-up speed width,

braking pressure modification means for reducing braking pressure by receiving the relaxation signal from said comparison means;

road surface detecting means for generating a detection signal when the friction coefficient between a road surface and a wheel becomes less than a predtermined level, and a pattern modification circuit, connected to said road surface detecting means, said comparison means and said reference wheel speed generating circuit, for first setting up a predetermined downward gradient as the gradient of said reference wheel speed signal at the beginning thereof when said reference wheel speed signal corresponds to the wheel speed, said predetermined gradient being independent of deceleration, and second, setting up either a

steeper or a slower gradient, after said braking pressure reducing signal has been generated, in accordance with whether said detection signal is generated, and

variation means for successively varying said set-up speed width in response to the magnitude of the vehicle body deceleration.

4,007,972

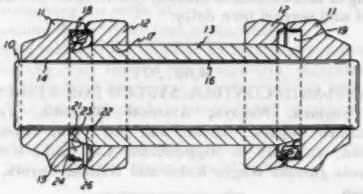
SEALED TRACK JOINT

John M. Baylor, Bettendorf, Iowa, assignor to J. I. Case Company, Racine, Wis.

Filed Oct. 1, 1975, Ser. No. 618,438

Int. Cl.² B62D *55/20*

U.S. Cl. 305—11 **7 Claims**



1. In a sealed track joint, a track pin, a cylindrical bushing extending over said pin and presenting a cylindrical contact area therebetween, a pair of track links on each respective end of said pin and said bushing for presenting an assembly of said links and said pin and said bushing, said links having surfaces facing each other along the axis of said assembly and being spaced apart relative to the axis of said assembly, and said assembly having circumferential and radially spaced-apart surfaces, with all said surfaces presenting a seal cavity, an elastomeric seal compressed in said cavity, the improvement comprising said seal being an endless ring and of an S-shape in cross section with two end leg portions respectively disposed radially inwardly and outwardly relative to the longitudinal axis of said ring, the two extending ends of said leg portions being in abutment with the respective said link surfaces, and the radially inwardly and outwardly disposed two said leg portions being in abutment with the respective said radially spaced-apart surfaces, and said two extending ends when in the free body unassembled position away from said assembly being spaced apart a distance greater than the spacing between said link surfaces, to be compressed therebetween in the assembly, and the radially inwardly and outwardly disposed two said leg portions when in the free body unassembled position away from said assembly being disposed to present an overall height of said S-shape greater than the radial dimension between said radially spaced-apart surfaces, to be compressed therebetween in the assembly.

4,007,973

FLUID BEARINGS

Roger Bernard Collins, 187 Cutlers Place, and Jonathan Anthony Henry Key, Craigie Lea, Croft Close, Corfemullen, both of Wimbourne, Dorset, England

Filed Mar. 11, 1974, Ser. No. 449,907

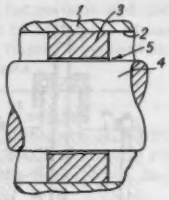
Claims priority, application United Kingdom, Mar. 20, 1973, 13183/73

Int. Cl.² F16C *17/16*

U.S. Cl. 308—9 **8 Claims**

1. A bearing member, of a fluid rotary bearing for use at speeds in excess of the "half speed whirl" speed of a solidly mounted bearing, comprising a substantially annular body formed at least partially, considered in the radial direction, of a material of which:

A. the tensile modulus lies in the range 75,000 and



1,500,000 pounds per square inch inclusive, and

B. the specific gravity is less than 3.

4,007,974

SELF-PRESSURE PRODUCING SLIDING THRUST BEARING

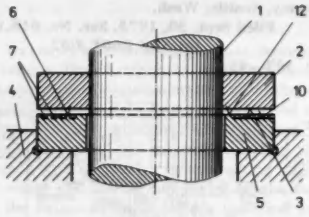
Wolfgang Huber, Schweinfurt, Germany, assignor to SKF Industrial Trading and Development Company, B.V., Nieuwegein, Netherlands

Filed Feb. 2, 1976, Ser. No. 654,329

Claims priority, application Germany, Feb. 1, 1976, 2504204

Int. Cl.² F16C *17/16*

U.S. Cl. 308—9 **10 Claims**



1. In a sliding thrust bearing having a first sliding bearing surface with grooves open to a lubricant supply, the grooves being inclined to the circumferential direction of the bearing, and a second bearing surface in sliding engagement with said first bearing surface, whereby hydrodynamic or aerodynamic pressure builds up in said grooves upon relative rotation of said first and second bearing surfaces in both circumferential rotational directions, the improvement wherein said first bearing surface has a plurality of regions each of which has a slot extending radially from a circumferential edge of said first bearing surface, and wherein each region further has first and second groups of grooves extending from opposite sides of the respective slots, the grooves of said first and second groups being oppositely inclined with respect to the circumferential direction of the bearing surface, whereby pressure builds up in said grooves of said first group upon relative rotation of said first and second surfaces in one direction, and pressure builds up in said grooves of said second group upon relative rotation of said first and second surfaces in the opposite direction.

4,007,975

ARTICULATED BEARING

Karl-Heinz Schutz, and Heinz Peter, both of Schweinfurt, Germany, assignors to SKF Industrial Trading and Development Company, B.V., Nieuwegein, Netherlands

Filed Feb. 2, 1976, Ser. No. 654,696

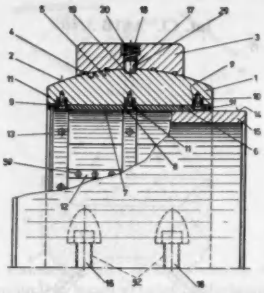
Claims priority, application Germany, Feb. 1, 1975, 7502998

Int. Cl.² F16C *27/00*

U.S. Cl. 308—238 **14 Claims**

1. In an articulted bearing having an inner ring with a spherical outer surface, an outer ring with a hollow spherical inner surface corresponding to and engagement with the outer

surface of the inner ring, and a sliding bearing surface in the inner cylindrical bore of the inner ring; the improvement wherein said sliding bearing surface comprises a plurality of plastic inserts arranged about the circumference of said bore, ring means adjacent to the inner ring at the axial ends of said inserts, said ring means having inclined surfaces engaged in the axial ends of said inserts for holding said inserts in said



bore, and strip means affixed to said inner ring in said bore between at least one pair of circumferentially adjacent inserts for inhibiting circumferential movement of said inserts in said bore, said inserts extending radially inwardly with respect to said ring means and strip means, in the unloaded condition of the bearing, a distance corresponding to the elastic deformation of said inserts under load.

4,007,976

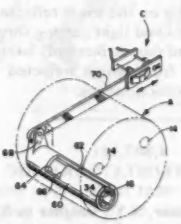
ELECTRICAL CONNECTORS

George W. Knecht, Brooklyn, N.Y., assignor to Midland-Ross Corporation, Cleveland, Ohio

Division of Ser. No. 530,061, Dec. 6, 1974, Pat. No. 3,971,609. This application Jan. 15, 1976, Ser. No. 649,395

Int. Cl.² H01R *3/06*

U.S. Cl. 339—14 RP **3 Claims**



1. An electrical connector socket comprising; a body member having a plurality of spaced-apart socket electrical contacts and a socket ground contact spaced from said electrical contacts, said ground contact including a sleeve member having a longitudinal slot therein, a keying groove in said body member aligned with said slot, locking means adjacent said ground contact for locking a ground pin therein, and said locking means including a sleeve member rotatably surrounding said ground contact and having a generally L-shaped slot therein including a main slot leg alignable with said ground contact slot and a rear lateral slot leg extending transversely of said main slot leg.

4,007,977

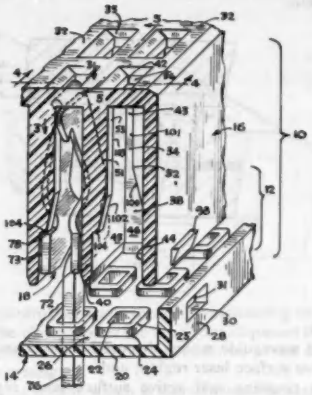
ELECTRICAL CONNECTOR

Gerhard Bauerle, Willsbach, Germany, assignor to Bunker Ramo Corporation, Oak Brook, Ill.

Filed May 9, 1974, Ser. No. 468,394

Int. Cl.² H01R *13/40*

U.S. Cl. 339—217 S **2 Claims**



1. An electrical connector comprising:

a dielectric housing including a base having an opening encircled by a raised collar and a body member having a front surface and at least one cavity open on said surface and rearwardly extending longitudinally therefrom in communication with the opening in said base defined by a box-like wall section with longitudinal sides in encircling engagement with said collar and a pair of limiting shoulders disposed apart from said sides and laterally separated parallel to said sides, and

at least one metallic contact, said contact being mounted in said housing and frontwardly including a pair of opposite, inwardly-facing spring arms for receiving a mating contact and rearwardly including spaced facing flanges abutting said collar and engaging said sides and a tail portion passing through the opening in said base for receiving a conductive element, said spring arms frontwardly including a pair of engagement portion means at least partially disposed in said box-like section and movable in a commmon plane with one of said portions facing said side and inwardly facing said other portion,

said engagement portion means including a pair of laterally offset tabs in inwardly limiting engagement with said shoulders, said shoulders located adjacent the longitudinal midplane between said engagement portions, each of said engagement portion means having one of said tabs extending laterally beyond the other portion to one of said shoulders and being outwardly movable away therefrom.

4,007,978

INTEGRATED OPTICAL CIRCUITS

William C. Holton, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 434,469, Jan. 18, 1974, abandoned. This application May 9, 1975, Ser. No. 575,862

Int. Cl.² G02B *5/14*

U.S. Cl. 350—96 WG **8 Claims**

1. In an integrated optics structure,

a source of laser radiation,

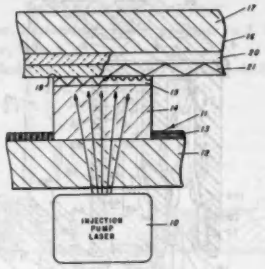
a surface laser operably associated with said source of laser radiation for receiving laser radiation therefrom, said surface laser comprising:

a substrate of semiconductor material taken from the group consisting of III-V semiconductor compounds and mixed ternary III-V semiconductor compositions,

a mesa of semiconductor material taken from the group consisting of III-V semiconductor compounds and mixed

ternary III-V semiconductor compositions mounted on said substrate, and

means defining an active surface laser region extending along the top of said mesa and in which laser radiation is generated in response to activation of said source of laser radiation causing the emission of laser radiation through said substrate and said mesa in a direction extending thereto;



optical waveguide means disposed in juxtaposition to said active surface laser region; and

means coupling said active surface laser region to said optical waveguide means by forming an evanescent field-coupling therebetween matching the phase velocity of the laser radiation generated in said active surface laser region to that of said optical waveguide means for transmitting laser radiation to said optical waveguide means.

4,007,979

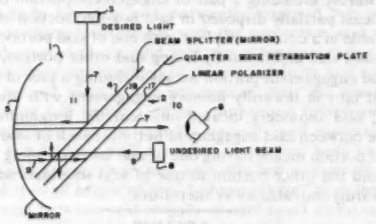
REFLECTION ELIMINATION SYSTEM

David B. Coblitz, Hazelwood, Mo., assignor to McDonnell Douglas Corporation, St. Louis, Mo.

Filed Apr. 18, 1975, Ser. No. 569,480

Int. Cl.² G02B 27/10

U.S. Cl. 350—156 **15 Claims**



1. In a device including a material which partially polarizes radiation passing through it, said material having a P axis and an S axis, the improvement which comprises a retarder and a linear polarizer for imparting an elliptical polarization to radiation passing through the retarder and the linear polarizer, said retarder having a fast axis and a slow axis, said fast axis being aligned parallel to one of said P and S axes of said material, the retardance of the combination of said retarder and said material being approximately a quarter wave, said linear polarizer having a pass axis, said pass axis being placed at an angle ϕ with respect to the P axis of said material, where ϕ is determined from the formula $\tan^2\phi = t_p^2/t_s^2$, in which t_p is the amplitude transmittance of the material for light polarized in the P direction, and t_s is the amplitude transmittance of the material for light polarized in the S direction.

4,007,980

DEVICE FOR THE MEASUREMENT OF THE SIZE OF AN EYE PUPIL

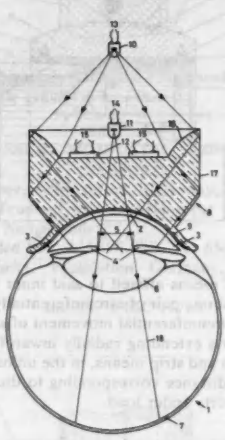
Daniel Bracher, Beethovenstrasse 10, 3073 Gumligen, and Walter Lotmar, Chaumontweg 102, 3028 Spiegel, near Berne, both of Switzerland

Filed Aug. 19, 1975, Ser. No. 605,871

Claims priority, application Switzerland, Aug. 23, 1974, 11556/74

Int. Cl.² A61B 3/10

U.S. Cl. 351—6 **15 Claims**



1. A device for measuring the size of an eye pupil, comprising:

contact body means made of a transparent material, for adhering to and moving with the eye;

illuminating light source means, fixedly connected to said contact body means, for directing illuminating light divergently towards the eye;

light detection means, fixedly connected to said contact body means, for detecting light reflected by the eye; and

optical system means, integral with said transparent contact body means, for collecting the diverging light from said illuminating light source means and directing the collected light obliquely onto the iris, the light converging towards the optical axis of the eye through an annular area of the cornea,

whereby light impinging on the iris is reflected toward said light detection means and light passing through the pupil does so obliquely and thus strikes only lateral parts of the fundus of the eye, from which reflected light will not reach said light detection means.

4,007,981

DUAL MODE ELECTROSTATOGRAPHIC PRINTING MACHINE

Robert N. Goren, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 10, 1975, Ser. No. 566,873

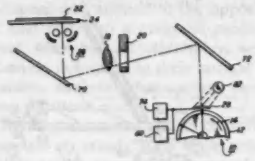
Int. Cl.² G03G 15/30

U.S. Cl. 355—4 **11 Claims**

5. An electrophotographic printing machine of the type having an arcuate photoconductive member, including:

a screen member mounted movably in the printing machine closely spaced to the photoconductive member, said screen member comprises an arcuate member having a curvature equal to the curvature of said arcuate photoconductive member with the centers of curvature being in coincidence with one another and the radius of curvature of said screen member being greater than the radius of curvature of said photoconductive member;

means for adjusting the spacing between the photoconductive member and said screen member; and



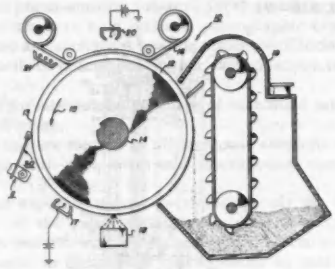
means for translating said screen member relative to said photoconductive member while maintaining the spacing between said screen member and photoconductive member substantially constant.

4,007,982

METHOD AND APPARATUS FOR ULTRASONICALLY CLEANING A PHOTOCONDUCTIVE SURFACE

Klaus K. Stange, Pittsford, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Feb. 6, 1975, Ser. No. 547,523
Int. Cl.² G03G *21/00*
U.S. Cl. 355—15 **22 Claims**



1. A cleaning appratus for removing particulate material from an imaging surface of an electrostatographic imaging member which is arranged for movement in a desired direction, said apparatus comprising:

means for removing said particles from said surface, said removing means comprising at least one blade member having an edge engaging said surface, said blade member extending across said surface; and

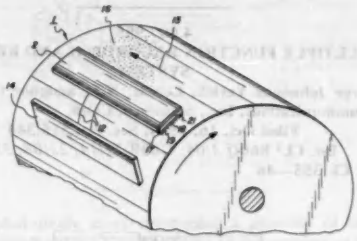
means for vibrating said blade member in a direction substantially parallel to said surface and transverse to the direction in which said imaging surface is movable and at an ultrasonic frequency which is sufficiently high to substantially reduce the frictional resistance between said blade edge and said imaging surface and with a vibrational amplitude at said blade edge sufficiently small to insure sufficient conformity between said blade edge and said imaging surface for providing adequate cleaning of said particulate material therefrom.

4,007,983

LIQUID DEVELOPER CLEANING MEANS

James J. Knieser, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 29, 1975, Ser. No. 626,955
Int. Cl.² G03G *21/00, 13/00*; A46B *15/00*
U.S. Cl. 355—15 **16 Claims**



7. An apparatus for the improved conditioning of reusable surfaces to be cleaned after the liquid development thereon of a charge pattern and the transfer therefrom of the developed pattern comprising:

a. a cleaning means which is brought into moving contact with the surface to be cleaned; and downstream therefrom in the direction of motion of the surface to be cleaned;

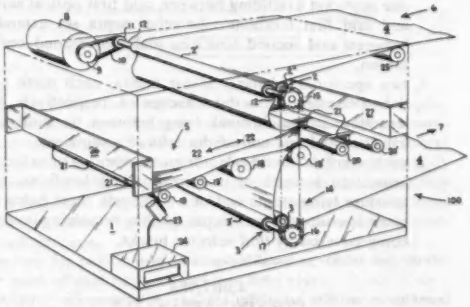
b. a stationary, compressible pad having a pattern of raised and depressed portions on the substantially non-absorbing working surface for redistributing transferable deposits of liquid developer remaining on the surface to be cleaned to other areas of said surface.

4,007,984

METHOD AND APPARATUS FOR HANDLING A BELT OF PHOTOCONDUCTIVE MATERIAL

Christian A. Beck, Ridgefield, and David W. Hubbard, Stamford, both of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Continuation of Ser. No. 384,938, Aug. 2, 1974, abandoned. This application Sept. 4, 1975, Ser. No. 610,295
Int. Cl.² G03G *15/00*
U.S. Cl. 355—16 **11 Claims**



4. A device for handling a quantity of fan-folded photoconductive web material comprising:

means for supporting fan-folded photoconductive web material, said material comprising an endless web at least a portion of which is compactly arranged with respect to said supporting means to constitute a stored mass of said fan-folded material;

edge abutment means disposed on either side of said supporting means and being spaced apart a distance substantially greater than a length of said material thereby defining a limited path of travel of said stored mass of material relative to said supporting means; and

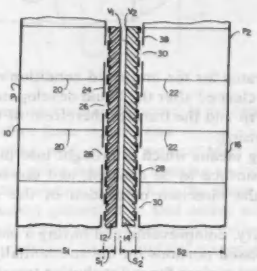
feed means operatively associated with said endless web of material for simultaneously feeding said endless web of material to said stored mass of fan-folded material and dispensing said endless web of material from said stored mass of fan-folded material whereby the amount of material in said stored mass remains substantially constant while the fan-folded material in said stored mass is continuously changing.

4,007,985

MULTIPLE FUNCTION RECORDING AND READOUT SYSTEM

George Johannus Yevick, Leonia, N.J., assignor to Personal Communications, Inc., Stamford, Conn.

Filed Oct. 16, 1974, Ser. No. 515,344
Int. Cl.² B60Q *3/04*; **G03B** *21/14, 23/08, 33/14*
U.S. Cl. 355—46 **5 Claims**



1. A plural-function optical apparatus, including,

a. a first optical screen,

b. a first lensfiche whose lensettes face said first screen, said first lensfiche being parallel to said first optical screen,

c. a second lensfiche, parallel to said first lensfiche, whose emulsion side faces the emulsion side of said first lensfiche,

d. a second optical screen, parallel to said second lensfiche, on the same side of said second lensfiche as the latter's lensettes.

e. two sets of septa each defined by opaque, intersecting walls, said intersecting walls defining openended cells, said septa walls being orthogonal to said optical screens, one septa set extending between said first optical screen and said first lensfiche, the other septa set extending between said second lensfiche and said second optical screen,

f. two apertured, planar selector masks, each mask positioned contiguous to the lensettes of, respectively, said lensettes, and each mask lying between its contiguous lensettes and one end of the cells of a septa set,

g. each aperture of said selector masks opening onto a single associated lensette of a corresponding lensfiche, each aperture lying at one end of a septa cell, there being one mask aperture for each septa cell, the remaining lensettes being covered by said selector masks.

4,007,986

COPYING APPARATUS

Shigehiro Komori, Yokohama; Hajime Katayama, Tokyo, and Masashi Suda, Iruma, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

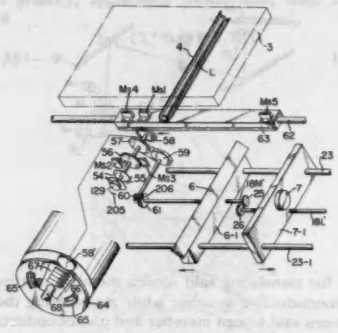
Filed Dec. 19, 1974, Ser. No. 534,160
Claims priority, application Japan, Dec. 28, 1973, 48-924
Int. Cl.² G03B *27/34*
U.S. Cl. 355—57 **7 Claims**

1. A copying apparatus for varying the magnification of images projected from an original onto a recording member comprising:

a reciprocable original carriage;

means for producing an image of the original;

optical means for projecting the image from a scanning position, said optical means including a mirror and lens combination movable to vary the magnification of the projected image and wherein said scanning position varies with movement of said mirror and lens combination;



means for moving the recording member past the projected image to thereby form an image on the recording member; and

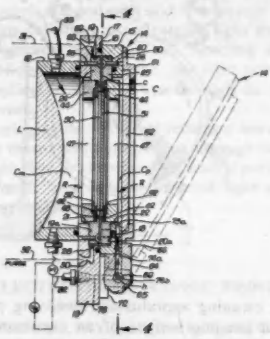
control means for actuating said moving means in accordance with the position of said mirror and lens combination.

4,007,987

VACUUM CONTACT PRINTING SYSTEM AND PROCESS FOR ELECTRONIC CIRCUIT PHOTOMASK REPLICATION

Ronald E. Sheets, Westminster, Calif., assignor to Tamarack Scientific Co. Inc., Orange, Calif.

Filed Jan. 12, 1976, Ser. No. 648,209
Int. Cl.² G03B *27/20*
U.S. Cl. 355—91 **16 Claims**



15. The process of contact printing a photomask copy plate from a photomask master plate within a sealed housing of a contact printer, and containing a window for entrance of printing radiation, that includes:

supporting said plates in mutual contact, in the field of said radiation, between elastically deformable elastomeric seals contacting the oppositely facing outside faces of said plates continuously around the margins thereof, said elastomeric seals being elastically deformable to permit separation of said plates and thereby enlargement of a central vacuum chamber space around and between said plates in response to application to the oppositely facing surfaces of said plates of incrementally higher vacuums

than a vacuum existing in said central vacuum chamber space,

applying an increasing vacuum to said central vacuum chamber, and incrementally higher increasing vacuums to the oppositely facing surfaces of said plates, to the extent that said surfaces limitedly separate,

limiting the vacuums developed in said central vacuum chamber space and applied to the oppositely facing surfaces of said plates to a common predetermined maximum level, whereby said elastomeric seals return from their relatively deformed to their normal relatively undeformed states, and said plates return toward their initial contacting positions,

thereafter holding a vacuum in said central vacuum chamber in a relatively steady state while reducing the vacuums applied to the opposite surfaces of said plates to a predetermined lower level, whereby a resultant pressure differential acts to force said plates against one another for a dwell period, and

exposing said photomask master and copy plates to radiation for a following exposure period.

4,007,988

MANUFACTURE OF MULTI-LAYER STRUCTURES

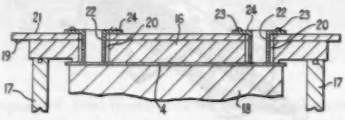
Ian Derek Bromfield, Leicester, and Peter Seddon, Wigan, both of England, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed May 3, 1974, Ser. No. 466,914

Claims priority, application United Kingdom, May 3, 1973, 21073/73

Int. Cl.² G03B 27/00

U.S. Cl. 355—133 **4 Claims**



2. Apparatus for use in positioning a succession of masks relative to a photo-sensitive substrate for the manufacture of a multi-layer structure by a series of photographic exposures, the substrate and each mask bearing respective fiducial marks which are utilized in such positioning, said apparatus comprising:

a. means for adjusting the position of each mask relative to said substrate;

b. first exposure means for exposing said substrate surface through each mask when said adjustment is completed; and

c. second exposure means for exposing only the fiducial marks of the substrate and immediately surrounding regions thereof, without interposing the fiducial marks on said masks in the path of said exposure by said second means, upon but not simultaneously with each exposure of the substrate surface through each mask by said first means, so that no photographic images corresponding to the mask fiducial marks are formed on the substrate due to each said exposure by said first means.

4,007,989

HADAMARD FILTER DESIGN

Edward S. Wajda, Poughkeepsie, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

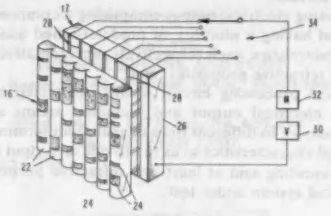
Filed Sept. 29, 1975, Ser. No. 618,308

Int. Cl.² G01J 3/42

U.S. Cl. 356—96 **5 Claims**

1. In a Hadamard transform spectrometer having a dispersive element arranged to disperse an elongated beam of spectral energy to be analyzed, the combination comprising:

a lens array disposed in the path of the dispersed beam and having a plurality of lens rows corresponding in number to at least the number of spectral elements to be analyzed, each row receiving spectral energy dispersed over a bandwidth containing such spectral elements, said array further comprising opaque means on said array providing a Hadamard mask in each lens' row,



and a photodiode array comprising a plurality of linear photodiode means corresponding to the number of lens' rows, said diode array being juxtaposed to said lens array whereby each lens' row directs the spectral energy incident thereon onto a different one of said photodiode means.

4,007,990

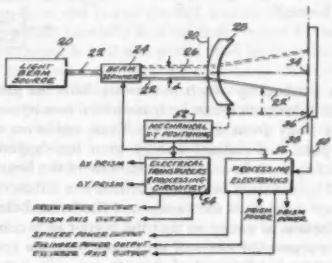
APPARATUS AND METHOD FOR MEASURING REFRACTIVE PROPERTIES OF A SPHERO-CYLINDRICAL OPTICAL SYSTEM

Howard I. McDevitt, Jr., Reston; Ronald F. Bax, Burke, and Richard H. Body, Centreville, all of Va., assignors to Acuity Systems, Incorporated, McLean, Va.

Filed May 23, 1975, Ser. No. 580,213

Int. Cl.² G01B 9/00

U.S. Cl. 356—124 **80 Claims**



1. Apparatus for measuring refractive properties of a sphero-cylindrical optical system under test including the measurement of at least one of the spherical power, cylindrical power and cylindrical axis refractive properties which are potentially present in a sphero-cylindrical optical system, said apparatus including: light source means for providing a beam of incident light rays emanating along the general direction of a predetermined line axis,

means for positioning said optical system under test in the path of said beam of incident light rays,

relative movement means for effecting relative rotational motion at a predetermined rotative frequency f_1 between said beam of incident light rays and said optical system under test so as to cause the beam to effectively move about a predefined first locus in the plane of said optical system under test and thereby produce a refracted light beam which moves correspondingly about a second locus in a subsequent plane parallel to the plane of the optical system, said second locus having relative maximum and minimum dimensions representative of the spherical power, cylindrical power, and cylinder axis refractive parameters,

photo detector means having a photoelectric position sensitive surface disposed in the path of said refracted light beam for producing an analog electrical output having an instantaneous magnitude representative of the relative instantaneous position on said position sensitive surface at which the refracted light beam strikes the photosensitive surface,

said analog electrical output comprising a composite analog signal having a plurality of predetermined analog signal characteristics, each respectively representative of one of said refractive properties, and

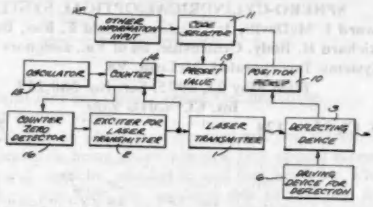
electrical processing circuit means connected to receive said electrical output and including means selectively responsive to different ones of said predetermined analog signal characteristics so as to provide an output indication representing said at least one refractive property of the optical system under test.

4,007,991

SYSTEM FOR TRANSMITTING POSITION INFORMATION

Hans R. Robertsson, Molndal, Sweden, assignor to Saab-Scania Aktiebolag, Linkoping, Sweden

Continuation of Ser. No. 484,958, July 1, 1974, abandoned. This application Dec. 3, 1975, Ser. No. 637,107
Claims priority, application Sweden, July 2, 1973, 7309268
Int. Cl.² G01B 11/26; B22D 7/10
U.S. Cl. 356—141 **3 Claims**



1. A method by which numerous different predetermined items of information can be transmitted one by one towards a moving body from a relatively fixed radiation emitter that emits pulses of radiant energy in a fan-shaped beam and sweeps angularly in a direction flatwise of the beam, each such item of information being transmitted in a different and predetermined portion of the sweep and the beam being narrow in the direction of sweep so that the body can receive only such of the transmitted items of information as are appropriate to its position at the time the beam intercepts it, but the width of the beam and the rate of sweep being so related to the expected speed of the body that at least two radiant energy pulses are detectable at the body during each sweep, said method enabling each such transmitted item of information to comprise a plurality of kinds of data, as for example sweep angle data and beam identification data, said method being characterized by:

A. assigning to each item of information to be transmitted a whole number which is unique to that item of information;

B. at the radiation emitter generating encoding clock pulses at a regular rate;

C. by counting encoding clock pulses beginning at the end of an invariant non-characterizing time period following each emission of a radiant energy pulse, so controlling the time interval between said emission and the next succeeding emission of a radiant energy pulse that said time interval is equal to

1. said non-characterizing time period

2. plus a characterizing time period which is measurable in a whole number of consecutive time units of a constantly uniform short duration, each of said time units being defined by the generation of a whole number of encoding clock pulses and the number of said time units in said characterizing time period being equal to the whole number assigned to an item of information to be transmitted during said time interval;

D. at the body, generating decoding clock pulses at a regular rate which is so related to said rate at which said encoding clock pulses are generated that an integral number of decoding clock pulses are issued during each of said time units; and

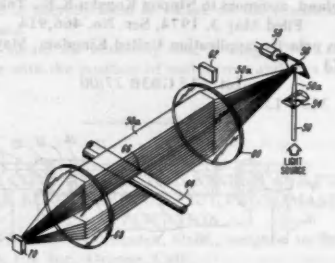
E. beginning after said non-characterizing time period following reception at the body of an emitted radiant energy pulse, counting decoding clock pulses generated until the next radiant energy pulse is received, to enable decoding of the item of information signified by the time elapsed between two successively received radiant energy pulses.

4,007,992

LIGHT BEAM SHAPE CONTROL IN OPTICAL MEASURING APPARATUS

Harry G. Petrohilos, Yellow Springs, and Francis M. Taylor, Xenia, both of Ohio, assignors to Techmet Company and Systems Research Laboratories, Inc., both of Dayton, Ohio

Filed June 2, 1975, Ser. No. 582,690
Int. Cl.² G01B 11/04, 11/10
U.S. Cl. 356—160 **5 Claims**



1. In optical measuring apparatus for measuring an object of the type having a light source to produce a collimated substantially round light beam of small diameter, means for rotating the light beam about a predetermined axis to scan the light beam, means for converting the rotating scanning light beam into a parallel scanning light beam, and photodetector means for sensing the parallel scanning light beam, the improvement for providing average contour sensing in an environment in which irregular surfaces are present on the object measured comprising a cylindrical lens positioned between the light source and the means for rotating the light beam, the light beam passing through the cylindrical lens, changing the shape of the light beam from a substantially round light beam into a light beam having an elongate shape, the light beam having a major dimension normal to the direction of scan movement of the light beam.

4,007,993

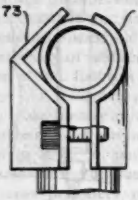
PIPE COUPLER

Edward J. Schwartz, 758 Perrien Place, Grosse Pointe Woods, Mich. 48236

Filed Apr. 4, 1975, Ser. No. 565,084
Int. Cl.² F16B 7/00
U.S. Cl. 403—3 **1 Claim**

1. A pipe coupler comprising a pair of gripping members, each of said gripping members having a plurality of angularly displaced channels and a plurality of planar webs disposed between said channels, said channels of one of said gripping members having an arcuate cross-section and said channels of the other of said gripping members having a V-shaped cross-section, said gripping members being adapted to be mated together in spaced apart relationship to connect a plurality of

pipes between corresponding ones of said channels, and means cooperable with corresponding ones of said webs for



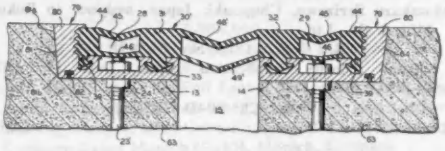
drawing said gripping members into closer spaced apart relationship, whereby the pipes are rigidly secured between said gripping members.

4,007,994

EXPANSION JOINT WITH ELASTOMER SEAL

Delmont D. Brown, North Baltimore, Ohio, assignor to The D. S. Brown Company, North Baltimore, Ohio

Filed Dec. 18, 1975, Ser. No. 641,891
Int. Cl.² E01C *11/02*
U.S. Cl. 404—69 **7 Claims**



1. An expansion joint frame structure with an elastomer seal and tread comprising a pair of opposed, elongated, side frames adapted to be mounted on respective steps in the upper corners of a pavement or a bridge deck expansion joint, an elongated elastomer seal removably mounted on said side frames and extending therebetween, said side frames each having a bottom wall adapted to rest on a step in the pavement or bridge deck in the respective upper corners of the joint and further having a joint-remote, upstanding end wall, said bottom wall having a downwardly opening slot extending longitudinally of its respective side frame adjacent the intersection of said end wall and said bottom wall, and an elongated elastomer gasket strip mounted in said slot to provide a longitudinal seal adapted to provide a longitudinal water tight seal between the lower, joint remote corner of said frame and said step, said bottom wall having therein a plurality of longitudinally spaced holes through which protrude upwardly respectively threaded ends of downwardly extending anchor bolts, and nuts threaded on respective threaded ends of said anchor bolts and seated against the upper surface of said bottom wall, whereby said nuts are accessible from the upper side of said side frame for removal of said nuts from said anchor bolts in order to remove said side frame from said step for repair or replacement.

4,007,995

METHOD OF PROVIDING A SURFACE DRESSING FOR A ROADWAY

Serge Rofidal, Paris, France, assignor to Huiles Goudrons et Derives, Paris, France

Filed July 9, 1975, Ser. No. 594,435
Claims priority, application France, July 16, 1974, 74.24732; Apr. 10, 1975, 75.11273
Int. Cl.² E01C *7/06*
U.S. Cl. 404—77 **6 Claims**

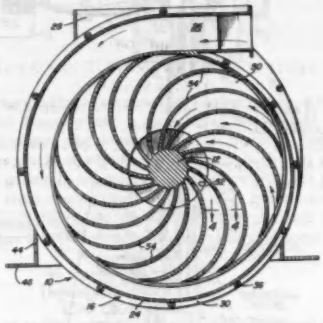
1. The method of providing a surface coating on roadways constituted by a binder and aggregate comprising, the steps of, placing a layer of aggregates in physical contact with a solid layer of binder formed of 70% to 85% by weight of bitumen and 15% to 30% by weight of pitch tar and thereafter heating the layer thus obtained until the temperature of the binder, measured at a depth of 1 mm below the surface of the binder, reaches a temperature of between 100° C. and 200° C.

4,007,996

TURBINE ENGINE AND PUMP

Henry S. Boone, 2342 Midfield Drive, Montgomery, Ala. 36111

Filed Jan. 22, 1976, Ser. No. 651,296
Int. Cl.² F04D *17/02*
U.S. Cl. 415—120 **4 Claims**



1. A fluid pressure device in the form of a turbine or pump comprising a housing defined by spaced parallel end plates interconnected by a peripheral wall having a constant diametric dimension from end to end thereof, a rotor disposed within the housing, a shaft centrally located with respect to the rotor and being journaled in said end plates, said housing including a tangential inlet and outlet with the peripheral wall spiralling inwardly from the inlet and outlet to provide a tapering converging inlet channel and diverging outlet channel extending around a major of the periphery of the housing with the inlet and outlet being oppositely disposed, said rotor including a central, circular partition plate, a plurality of equal length and width radial blades on each side of said partition plate, the outer ends of the blades coinciding with the periphery of the partition plate, said partition plate including a centrally disposed opening enabling passage of fluid therethrough whereby fluid enters the inlet, travels radially inwardly along one surface of the partition plate, make a U-turn through the opening in the partition plate and then radially outwardly along the other side of the partition plate for discharge through the outlet, said peripheral wall of the housing having an inwardly extending peripheral partition member conforming with and closely spaced in aligned relation to the partition plate on the rotor to divide the rotor and housing into inlet and outlet portions, the inner ends of said blades extending inwardly of the periphery of the opening in the partition plate and being rigid with said shaft.

4,007,997

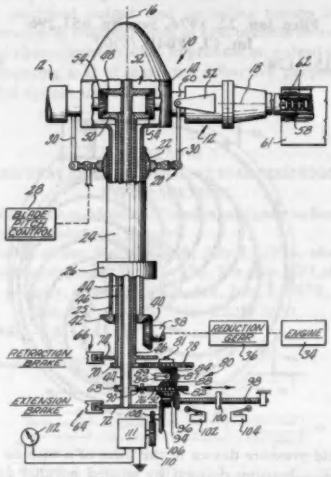
ROTOR DIAMETER INDICATOR

Jay Martin Yarm, Milford, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Nov. 5, 1975, Ser. No. 628,873
Int. Cl.² B64C *11/28*
U.S. Cl. 416—61 **6 Claims**

1. In a helicopter rotor, a plurality of blades, each having inner and outer telescoping blade portions and a jackscrew shaft for extending and retracting said outer blade portion to vary the length of the blade, a rotor drive shaft having a hub

to which said inner blade portions are attached, means for extension and retraction of said blades including a differential gearing in said hub, concentric inner and outer blade extension and retraction shafts within said rotor drive shaft, said concentric shafts having input gears in said hub comprising the differential gears of said differential gearing, output bevel gears in said hub fixed to the inboard ends of said jackscrew shafts and meshing with said input bevel gears, clutch means on said extension and retraction shafts operable by the pilot for holding one or the other of said shafts, a drive gear fixed to



each of said extension and retraction shafts, a second differential gearing including a centerbody having a differential output shaft fixed thereto, differential input gears journaled for rotation on said output shaft on opposite sides of said centerbody each driven by one of said drive gears on said extension and retraction shafts, differential bevel gears fixed to said input gears, a bevel gear mounted for rotation on said centerbody and meshing with said differential bevel gears, a drive gear fixed on said output shaft, a potentiometer driven by said output shaft drive gear, and a rotor-diameter indicator electrically connected to said potentiometer.

4,007,998

BLADE ASSEMBLY

George A. Blasiole, and Alexander A. Carroll, both of Greensburg, Pa., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Aug. 22, 1975, Ser. No. 607,073

Int. Cl.² F01D *7/00, 11/00*

U.S. Cl. 416—135 **3 Claims**

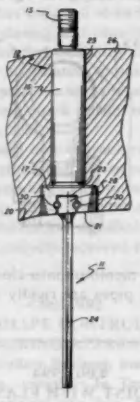
1. An adjustable blade assembly for use in a rotary machine for processing a working fluid, said blade assembly including an airfoil and an independent airfoil support,

said support further including a platform of generally cylindrical form having a trunnion secured to one end face thereof, the support being pivotably mounted within a mounting ring with the opposite face of the platform being coextensive with one surface of said ring,

said opposite face of the platform having an aperture formed therein,

said airfoil being seatable upon said platform and having a root dependent therefrom which is loosely received in said aperture, and

means for preventing the airfoil from moving radially in



reference to the platform when said airfoil root is positioned within said aperture.

4,007,999

FAN ROTOR FOR CROSSFLOW FAN

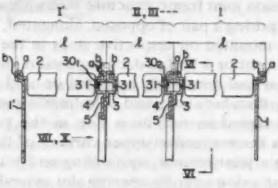
Masakazu Serizawa, Chigasaki, Japan, assignor to Rokugo Mfg. & Co., Ltd.

Filed Oct. 2, 1975, Ser. No. 618,944

Claims priority, application Japan, Dec. 19, 1974, 49-144988

Int. Cl.² F04D *29/28*

U.S. Cl. 416—178 **4 Claims**



1. A fan rotor for a crossflow fan mounted on a drive shaft and having two end fan rotor units spaced in confronting relation with a plurality of intermediate fan rotor units connected therebetween, said connected rotor units each having a plurality of radially projecting blades and end flanges projecting axially, the axial length of said connected rotor units being greater than the diameter of said rotor units, and said rotor unit connections comprising

a first intermediate disc formed with a circular configuration having its outer periphery turned inwardly to enclose an end portion of one of said flanges adjacent thereto, an intermediate section of said first intermediate disc formed with a concave annular shape facing outwardly, the central part of said first intermediate disc having a central opening for said drive shaft, and the inner periphery of said opening being turned outwardly;

a second intermediate disc mounted in abutting relation to said first intermediate disc, said second intermediate disc formed with a circular configuration having its outer periphery of substantially the same diametral dimension as said outer periphery of said first intermediate disc, said second intermediate disc having its outer periphery turned inwardly in opposition to said outer periphery of said first intermediate disc to enclose an end portion of another of said flanges adjacent to said flange enclosed by said first intermediate disc, an intermediate section of

said second intermediate disc formed with a concave annular shape facing outwardly and opposite to said concave annular section of said first intermediate disc to form an annular space therebetween, and the central part of said second intermediate disc having a central opening larger than said central opening in said first intermediate disc, the inner periphery of said second intermediate disc abutting a portion of said first intermediate disc between its inner periphery and its concave section;

a circular engaging plate having an outer diameter greater than the inside diameter of said inner periphery of said second intermediate disc, a central opening approximately equal to said central opening of said first intermediate disc, the inner periphery of said engaging plate positioned to be lockingly enclosed by said inner periphery of said first intermediate disc that is turned outwardly, an intermediate part on one side of said engaging plate abutting said first intermediate disc, and an outer part on the same side of said engaging plate abutting said second intermediate disc; and

interlocking means between said discs and said engaging plate providing a rigid connection for rotation of said rotor units.

4,008,000

AXIAL-FLOW ROTOR WHEEL FOR HIGH-SPEED TURBOMACHINES

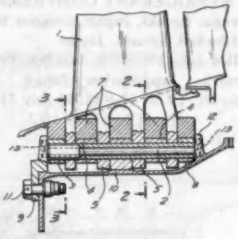
Ottmar Gradl, Munich; Wolf Loebel, Germering; Axel Rossmann, Karlsfeld; Herbert Zech, Neubiberg, and Gerhard Zahring, Munich, all of Germany, assignors to Motoren-und Turbinen-Union Munich GmbH, Munich, Germany

Filed Aug. 4, 1975, Ser. No. 601,767

Claims priority, application Germany, Aug. 28, 1974, 2441249

Int. Cl.² F01D *5/30*

U.S. Cl. 416—214 A **7 Claims**



1. An axial-flow rotor wheel for a high-speed turbomachine comprising:

a. a rotatable hub in the form of a thin-walled shell,

b. rotor blades arranged in an annular pattern around the axis of said hub, each blade having at least one blade root formed with a hole,

c. a pin extending parallel to the hub axis through the hole in each blade root,

d. at least one retaining ring coaxial with said hub and surrounding said pins for absorbing the radial forces produced by the blades on said pins when the rotor wheel rotates, and

e. means for preventing axial and circumferential movement of said pins with respect to said hub but for permitting radial movement of said pins with respect to said hub,

whereby said retaining ring constitutes substantially the only means for resisting radial movement of said pins with respect to said hub.

4,008,001

ROTOR FOR ROTARY INTERNAL COMBUSTION ENGINE

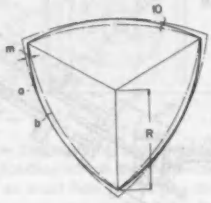
Yoshiyuki Tsujibayashi, Tokyo, and Ryuzo Ishihara, Fuchu, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed May 16, 1975, Ser. No. 578,365

Claims priority, application Japan, May 20, 1974, 49-58033

Int. Cl.² F01C *1/02*; **F02B** *55/02*

U.S. Cl. 418—61 A **3 Claims**



1. In a rotary internal combustion engine having a two-lobe epitrochoidal housing and a peripheral intake and exhaust port arrangement, the improvement comprising said rotor having lobes each of which is cut in the both end portions thereof at a gradually increasing amount toward apex portions of the rotor from a rotor profile based on an inner envelope of an epitrochoidal curve of the housing whereby said rotor at each apex has a radius smaller than that of said rotor profile.

4,008,002

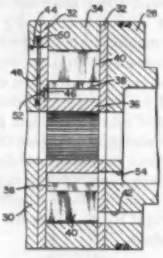
VANE PUMP WITH SPEED RESPONSIVE CHECK PLATE DEFLECTION

Albin J. Niemiec, Sterling Heights, and Raymond B. Pettibone, Troy, both of Mich., assignors to Sperry Rand Corporation, Troy, Mich.

Filed Nov. 7, 1975, Ser. No. 630,127

Int. Cl.² F04B *23/10*; **F01C** *19/08*; **F04C** *15/00*

U.S. Cl. 417—204 **1 Claim**



1. A balanced vane pump comprising a body having an inlet and an outlet for the pumped fluid and a driveshaft journalled therein, a cam ring secured in the body, a rotor driven by the shaft and carrying a plurality of slidable vanes, a flexible cheek plate having a first face adjacent an end face of the rotor and a side of the vanes with a second face adjacent the body, having fluid inlet openings in the first face of the cheek plate in the arcs through which the vanes move radially outwardly, having fluid discharge grooves in the first face of the cheek plate in the arcs through which the vanes move radially inwardly, hydrostatic pressure pads adjacent the second face of the cheek plate at the aforesaid arcs and in open communication with the outlet, and restricted passages between the discharge grooves and the pressure pads, dimensioned to provide negligible pressure drop to the flow occuring at low pump speeds but to provide significant and increasing pressure drop at higher pump speeds, whereby the cheek plate will be de-

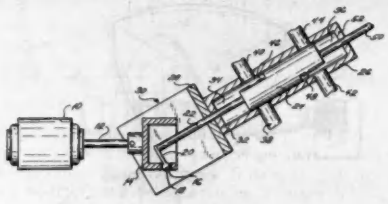
flected toward the rotor at low speeds to provide a minimal rotor-cheek plate clearance and will be less deflected at higher speeds to provide increased rotor-cheek plate clearance.

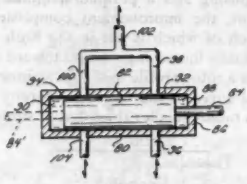
4,008,003

VALVELESS POSITIVE DISPLACEMENT PUMP

Harry E. Pinkerton, Bridle Path Lane, Mill Neck, N.Y. 11765

Filed June 27, 1975, Ser. No. 590,896
Int. Cl.² G05D *11/035*
U.S. Cl. 417—250 **11 Claims**





1. Apparatus fo proportionally mixing two fluids comprising a cylinder, a piston reciprocal and rotatable in said cylinder and dividing said cylinder into two working chambers, an inlet port for a first fluid to one of said chambers, an outlet port from said one chamber, and an inlet port to the other of said chambers, a conduit between said outlet port of said one chamber and the inlet port of the other of said chambers, an outlet port from said other chamber for mixed fluids, said piston having duct means sequentially registering with said ports, and conduit means connecting with said ports to form a fluid circuit, a drive piston rod secured to said piston and projecting from one end thereof to the exterior of the cylinder and connected to drive means for producing reciprocating and rotating movement of said piston, said piston rod being effective to reduce the volume of said one chamber through which it extends to be lesser than that of the other chamber, and second conduit means connected to said circuit and connectable to a supply of a second fluid whereby said second fluid is drawn into the circuit to make up for the difference in volumes in said chambers.

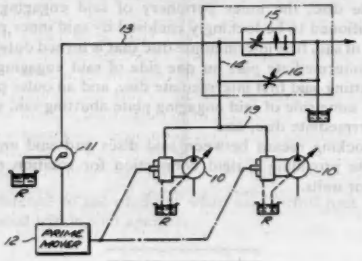
4,008,004

CONTROL SYSTEM FOR VARIABLE DISPLACEMENT PUMPS

Edwin L. Shaw, Delaware, Ohio, assignor to Abex Corporation, New York, N.Y.

Filed Dec. 22, 1975, Ser. No. 642,867
Int. Cl.² F15D *31/02*; F04B *49/00*, *1/26*
U.S. Cl. 417—216 **5 Claims**

1. In a control for a hydraulic system which includes a prime mover, a plurality of variable displacement pumps driven thereby, each pump having a movable thrust plate, a fluid motor connected to the thrust plate which is operable to pivot the thrust plate between a position of maximum fluid displacement in one direction and a position of maximum fluid displacement in another direction with a position of minimum fluid displacement therebetween and a independent control for selectively operating the fluid motor to move the thrust plate to thereby control the displacement of the pump, the improvement comprising a load sensing means, means connecting the load sensing means to the prime mover, the load sensing means having an output signal proportional to the load on the prime mover, each independent control including a rotary servo control valve which controls the fluid motor, the rotary servo control valve having an input assembly which includes a rotary input shaft which sets the position of the fluid motor to thereby set the displacement of the pump and the independent control further includes a variable ratio rotary input means connected to the rotary input shaft, second means connecting the variable ratio rotary input means to the



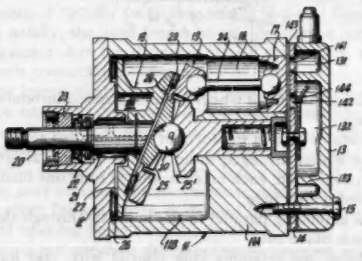
output signal and the variable ratio rotary input device includes rotary means for manually setting the position of the rotary input shaft, means responsive to said output signal for automatically changing the displacement of the pump in response to the output signal irrespective of the position of the manual setting means, said responsive means including an axially movable and rotatable control member, third means connecting the control member to the rotary means and the rotary input shaft and each of said variable ratio rotary input means changes the displacement of its respective pump relative to the setting of the rotary input shaft by the same percentage.

4,008,005

REFRIGERANT COMPRESSOR

Masaharu Hiraga, Isesaki, Japan, assignor to Sankyo Electric Company, Limited, Isesaki, Japan

Filed July 29, 1975, Ser. No. 599,973
Claims priority, application Japan, July 31, 1974, 49-88858; July 31, 1974, 49-88859; July 31, 1974, 49-88860
Int. Cl.² F04B *1/12*
U.S. Cl. 417—269 **7 Claims**



1. In a fluid suction and discharge apparatus comprising a generally cylindrical housing, a cylinder block mounted in and at one end portion of said housing, said block having a plurality of axially directed cylinders formed therein in equally spaced annular relation, a plurality of pistons slidably fitted in said cylinders respectively, a plurality of piston rods connected to said pistons respectively, an end plate mounted on the other end of said housing and closing said other end

thereof, a drive shaft rotatably borne in said end plate and extending from exterior to interior of said housing through said end plate, said drive shaft extending on an axis which extends on a mid point of a plurality of cylinders formed in spaced annular relation, a wedge-shaped rotor member mounted and fixed on an inner end portion of said drive shaft to be rotated together with said drive shaft within said housing, said wedge-shaped rotor being formed with an end surface inclined to said drive shaft by a predetermined angle at an end thereof opposite to the other end facing to said end plate, wobble means closely mounted, and relatively rotatably borne, on said inclined end surface of said rotor, means for supporting said wobble means at its position and permitting a wobbling motion of said wobble means about a point on said axis, and means for connecting said plurality of piston rods to said wobble means at angularly spaced positions thereon corresponding to said piston rods respectively, whereby said pistons are reciprocated within respective cylinders in different phase of reciprocating motion from one another by the rotation of said drive shaft to perform fluid suction and discharge, the improvement which comprises: said wobble means being formed such that a centroid thereof is on said point about which said wobble means wobbles, said rotor being so formed such that a centroid thereof is on said axis and centroids of two half sections of said rotor split by an imaginary plane and including said axis and perpendicular to a plane defined by said axis and a point on said inclined surface nearest to said cylinder block are axially spaced by a predetermined distance, said distance being so determined such that a torque due to centrifugal forces developed to said rotor during the rotation of said rotor cancels a torque due to the inertia of said pistons, said piston rods, and said wobble means during the reciprocation thereof.

4,008,006

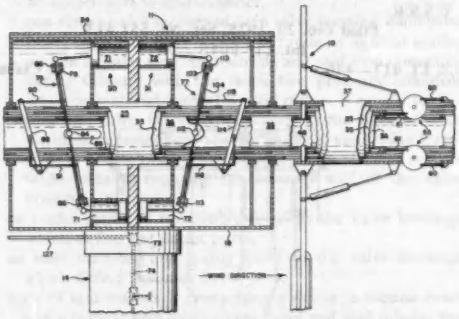
WIND POWERED FLUID COMPRESSOR

Karl J. Bea, 128 Dewitt St., Syracuse, N.Y. 13203

Filed Apr. 24, 1975, Ser. No. 571,395

Int. Cl.² F04B *1/10*

U.S. Cl. 417—271 **11 Claims**



1. In a wind powered machine, a fixed pitch wind blade assembly rotatively mounted in said machine for rotation in response to the force of the wind against said blade assembly, a variable displacement fluid compressor mounted in said machine, rotatable drive means connected between said blade assembly and said compressor for rotatably operating said compressor responsive to the rotation of said blade assembly by the wind, and compressor displacement control means operatively connected between said blade assembly and said compressor for varying the fluid displacement of said compressor directly with the drag force of the wind on said blade assembly.

4,008,007

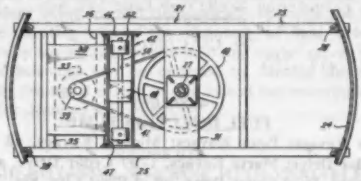
AXIAL FLOW FAN ASSEMBLY

Kelly V. Shipes, Houston, Tex., assignor to Hudson Products Corporation, Houston, Tex.

Filed May 23, 1975, Ser. No. 580,338

Int. Cl.² F04B *17/00*

U.S. Cl. 417—363 **16 Claims**



1. An axial flow fan assembly, comprising a fan ring, supporting means extending across and connected at its opposite ends to the ring, an axial flow fan having its shaft carried by the supporting means to mount its blades for rotation within said ring, said fan shaft having means thereon to which a motor may be connected, and a spring mass assembly carried by said supporting means intermediate its opposite ends so as to absorb at least a portion of the vibration of said supporting means which results from rotation of said fan therepast.

4,008,008

PUMPS

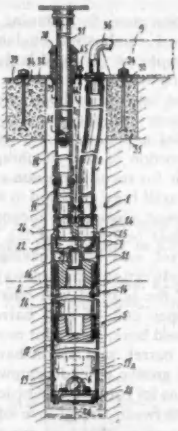
Marc Yves Vergnet, 1, Chemin du Val Doux, "La Paveigne", 83200 Toulon, France

Filed Jan. 3, 1975, Ser. No. 538,379

Claims priority, application France, June 21, 1974, 74.21593

Int. Cl.² F04B *9/08*

U.S. Cl. 417—385 **6 Claims**



1. A pump comprising a hollow housing having rigid walls to be immersed in a liquid to be sucked therein, said walls of said housing bearing an intake valve and a delivery valve connected to a delivery tube, said housing containing a resiliently deformable chamber connected through a said wall of said housing to an end of a control tube full of liquid in the operative position and having its other end connected to a control cylinder in which an actuating piston is slidably movable, between a position of maximum volume of a part of the cylinder connected to the resilient chamber and a position of minimum volume of said part of the cylinder, wherein the delivery tube and the control tube are connected to each other in the vicinity of the housing by a priming conduit including a check

valve for allowing the liquid to flow only from the delivery tube downstream of said delivery valve to the control tube, whereby the head of liquid in the delivery tube passes to the control tube to replace air in the deformable chamber and the control tube and the control cylinder.

4,008,009

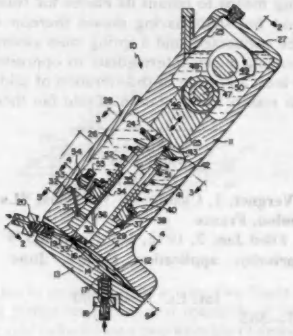
FUEL INJECTION PUMP

Endre Kovacs; Peter Kovacs; Michael Kovacs, all of 1708 Cedar Drive; Marta Kovacs, 1707 Cedar Drive, and Geza Kovacs, 1610 Cedar Drive, all of Plant City, Fla. 33566

Filed Sept. 30, 1975, Ser. No. 618,178

Int. Cl.² F04B *9/10, 7/06;* **F02M** *59/26*

U.S. Cl. 417—387 **2 Claims**



1. A fuel injection pump for pumping fuel under high pressure to an internal combustion engine comprising a body having cap means at one end, said body and said cap means having cooperating recesses defining a diaphragm cavity, a diaphragm located between said body and said cap means and separating said cavity into upper and lower portions, said cap means having inlet and outlet valve means communicating with the lower portion of said diaphragm cavity, said body having a reservoir for receiving a non-compressible liquid, a barrel having an axial bore mounted in said body and extending into said reservoir, passageway means providing communication between said reservoir and the lower portion of the bore of said barrel, said barrel having a groove extending along said bore between said passageway means adjacent said lower portion of the bore of said barrel and said reservoir adjacent the upper end of said barrel, a piston slidably mounted within said bore, means for moving said piston along the bore of said barrel, said piston having an angularly disposed peripheral groove extending upwardly from the lower end thereof, means for rotating said piston to alter the point of communication between the groove of said piston and the groove of said barrel so that said groove of said piston may selectively communicate with the groove of said barrel to permit said non-compressible liquid and gas bubbles to continuously pass through said angularly disposed peripheral groove of said piston and said groove of said barrel as said piston is moved along the bore of said barrel until said peripheral groove is moved from open communication with said groove of said barrel, and said body having at least one opening providing communication between the bore of said barrel and the upper portion of said diaphragm cavity, whereby the quantity of liquid forced from the bore of the barrel into the upper portion of the diaphragm cavity is regulated by the relative positions of the grooves in said piston and the bore of said barrel.

4,008,010

HYDRAULIC MACHINE

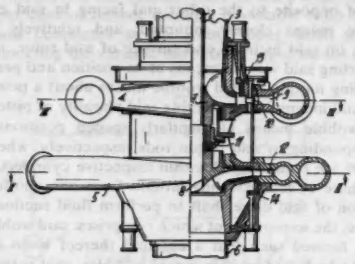
Michel Fauconnet, Geneva, Switzerland, assignor to Ateliers des Charmilles S.A., Geneva, Switzerland

Filed June 24, 1975, Ser. No. 589,800

Claims priority, application Switzerland, July 9, 1974, 9398/74

Int. Cl.² F04B *17/00*

U.S. Cl. 417—405 **13 Claims**



1. A hydraulic machine comprising a pump, a turbine, pump and turbine runners keyed on a common shaft, means defining separate first and second spaces for rotatably receiving the pump and turbine runner respectively, at least two first partial volutes communicating with said first space for connection to an upstream head, at least two second partial volutes communicating with said second space for connection to an upstream head, and means for separating each of said first and second spaces from the head to drain the respective space, said first and second partial volutes having inverted winding directions, and said pump and turbine runners being designed for the same direction of rotation.

4,008,011

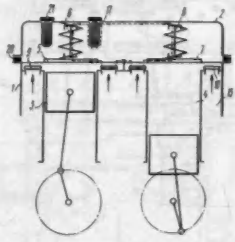
PISTON COMPRESSOR

Vsevolod Sergeevich Scherbakov, Konkovo-Derevlevo, korpus 7"v", kv. 120; Igor Andreevich Gruzintsev, Malaya Schukinskaya ulitsa, 5, korpus 2, kv. 14, and Viktor Mikhailovich Zolotukhin, Raduzhnaya ulitsa, 10, kv. 17, all of Moscow, U.S.S.R.

Filed Feb. 20, 1975, Ser. No. 551,413

Int. Cl.² F04B *7/00*

U.S. Cl. 417—446 **1 Claim**



1. A piston compressor comprising: a compressor cylinder block including at least two cylinders; a cover on said cylinder block; suction valves mounted inside each of said cylinders; pressure valves located inside each of said cylinders; a regulator for controlling the capacity of said piston compressor; an electromagnet coil on said regulator for actuating said suction valves and being installed on the outer side of said cover; a gasket of nonmagnetic material laid between said cylinder block cover and said cylinder block body; a magnetic circuit connecting said electromagnet coil to each of said suction

valves; said magnetic circuit being formed by said cylinder block cover, said cylinder block body and said pressure valves of each said cylinders.

4,008,012

DOUBLE-ACTING PUMP

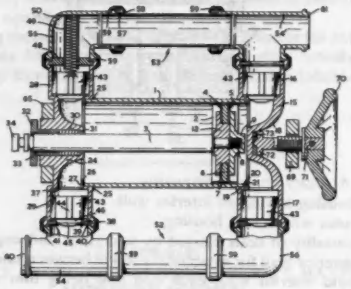
Victor John Page, 47 Westmiston Avenue, Saltdean, Sussex, England

Filed July 7, 1975, Ser. No. 593,504

Claims priority, application United Kingdom, July 9, 1974, 30365/74

Int. Cl.² F04B *21/02, 39/00*

U.S. Cl. 417—454 **4 Claims**



1. A double-acting pump comprising:
a metering cylinder,
a piston in the metering cylinder,
a pushrod attached to the piston,
a first end cap removably fitted at one end of the metering cylinder, said first end cap containing an annular seal which supports the pushrod for reciprocal movement therein,
a second end cap removably fitted at the other end of the cylinder,
a pair of valve housings fitted to each one of said end caps, each valve housing in said pair defining either an inlet or an outlet port to said cylinder,
a non-return valve located in each valve housing, each valve being supported in its housing between an annular seating and an annular stop, said seating and said stop communicating directly with the respective port and manifold whereby material, moved by said piston, is caused to flow past said valve, the external surface of the valve between portions engaging said seating and said stop being fluted so as to enable passage of material past said fluted surface while slidably engaging the internal wall of the valve housing,
an outlet manifold removably fitted to the valve housings which define the outlet ports,
an inlet manifold removably fitted to the valve housings which define the inlet ports,
each of said manifolds comprising a sleeve, a tubular bend and a tubular tee, said tubular bend and said tubular tee of said manifolds being removably connected to the respective housings,
a first backing plate clamped adjacent said first end cap,
a draw plate adjacent said second end cap,
at least two tie rods connected between said first backing plate and said draw plate,
a second backing plate adjacent said first backing plate, said second backing plate being provided for connection to fixed supporting means for said pump,
means connected to said draw plate for exerting a force on said second end cap whereby said end caps are drawn together, and
a locking collar adjacent said second backing plate and threadably engaging said first backing plate, said collar being movable on said treaded engagement either to exert a clamping force on said first and second backing plates to hold said pump fast, or to release said clamping force whereby said pump can be bodily rotated about the axis of the metering cylinder without releasing the force securing the end caps and the metering cylinder in sealing relationship, the valve housing in each pair of said valve housings being located diametrically opposite the other valve housing across the diameter of said cylinder, whereby the attitude of the inlet and outlet valves in the valve housings can be changed by turning the pump bodily through 180° about said axis of the metering cylinder for draining said pump.

4,008,013

FLUID ROTATIVE MACHINE WITH VARIABLE DISPLACEMENT

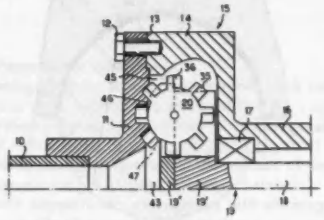
Eugeniusz M. Rylewski, 43 bis, Avenue du Gal Leclerc, 78470 St. Remy les Chevreuse, France

Filed Jan. 5, 1976, Ser. No. 646,677

Claims priority, application France, Jan. 3, 1975, 75.00153

Int. Cl.² F04C *29/10, 27/00, 17/00*

U.S. Cl. 418—16 **8 Claims**



2. In a rotative machine for fluids, including a plate with spiral-like passages for the circulation of fluid therethrough, in which also circulate the vanes of vane wheels carried by a disc coaxial with and facing said plate, the improvement therein which comprises:
spiral-like wall means placed inside said passages and movable in relation thereto so as to vary the cross-sections of the passages and, consequently, the fluid circulating therein.

4,008,014

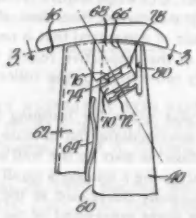
PISTON SEALS FOR ROTARY MECHANISMS

Paul J. Staebler, Dunlap, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 23, 1975, Ser. No. 625,225

Int. Cl.² F01C *1/02, 19/00;* **F04C** *17/02, 27/00*

U.S. Cl. 418—51 **3 Claims**



1. A rotary mechanism for use with a fluid comprising:
a housing defining a chamber;
a shaft journalled in said housing and extending through said chamber;

a rotor having plural apices journalled on said shaft and within said chamber, said rotor including apex seal receiving grooves at its apices and piston seal receiving bores intersecting said grooves;

apex seals disposed in said apex seal receiving grooves;

piston seals received in said bores;

balance pistons within said bores and abutting the associated piston seals adjacent the point of intersection of said bores and said grooves; and

fluid passages in said rotor establishing fluid communication with said bores and portions of the surface of said rotor remote from the corresponding apex, the fluid from said passages urging the corresponding balance piston into engagement with the associated piston seal.

4,008,015

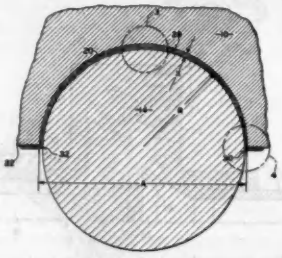
ROTOR-STATOR GEAR SET

Hugh L. McDermott, Minneapolis, Minn., assignor to Eaton Corporation, Cleveland, Ohio

Filed Nov. 3, 1975, Ser. No. 628,273

Int. Cl.² F01C *1/02;* **F03C** *3/00;* **F04C** *1/02;* **F16H** *55/10*

U.S. Cl. 418—61 B **15 Claims**



1. A pair of relatively movable members for use with a fluid comprising:

A. an externally toothed member; and

B. an internally toothed member cooperating in gear relationship with the externally toothed member and having at least one more tooth than the externally toothed member, the internally toothed member including

1. an annular inwardly facing peripheral wall,

2. a plurality of circumferentially spaced pockets opening radially inwardly into the inwardly facing peripheral wall, the wall of each pocket being defined in part by a pair of spaced arcuate surfaces on the internally toothed member,

3. a cylindrical roller in each of the pockets forming the teeth of the internally toothed member, each of the rollers being in contact with the respective pair of arcuate surfaces, to form a seal which will substantially restrict the flow of fluid between the roller and the arcuate surfaces when a force is exerted on the roller in a radially outwardly direction, the arcuate surfaces being made of a material that is resilient relative to the material of the respective rollers to allow for radially outwardly movement of the rollers in their respective pockets,

4. an enclosed space for trapping fluid in each of the pockets intermediate the arcuate surfaces, the space being defined in part by the wall of the pocket and the roller and having a relatively small volume which would be substantially decreased in the absence of trapped fluid with slight movement of the roller in the radially outwardly direction to cause an increase in the pressure of the trapped fluid within the enclosed space upon such radially outwardly roller movement, and

5. a tangent circle that interferes with the average diameter of the externally toothed member whereby rotation of the externally toothed member relative to the internally toothed member will create a radially outwardly directed force on each of the rollers tending to move each of the rollers radially outwardly in the respective pocket.

4,008,016

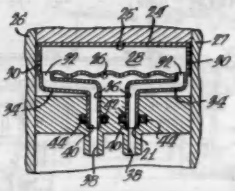
OIL COOLED SEAL FOR ROTARY ENGINE

Alexander Goloff, East Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed June 2, 1975, Ser. No. 583,238

Int. Cl.² F01C *21/06;* **F16J** *15/16*

U.S. Cl. 418—92 **2 Claims**



1. A rotary engine comprising:

a housing having an interior wall;

a rotor within said housing;

a plurality of seals carried by said rotor and engaging said interior wall for establishing a seal between said rotor and said interior wall; each said seal being thin walled and hollow and further having a fluid inlet and a fluid outlet; and

means, including conduits in said rotor for directing a coolant through each of said seals via the inlets and outlets of each said seal and said conduits, each said seal including a corrugated surface for flexibility to allow the same to conform to the shape of said interior wall.

4,008,017

SEAL ARRANGEMENT FOR ROTARY ENGINES

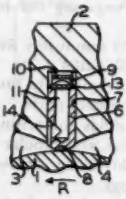
Karl-Friedrich Hennig, Schloss Ricklingen; Wolfgang Kalthenthaler, Wennigsen; Werner Heger, Hover; Fritz Isernhagen, Letter; Manfred Kramer, Barsinghausen, and Wilhelm Pape, Wunstorf, all of Germany, assignors to WABCO Westinghouse GmbH, Hannover, Germany

Filed Oct. 20, 1975, Ser. No. 623,766

Claims priority, application Germany, Oct. 31, 1974, 2451669

Int. Cl.² F04C *27/00*

U.S. Cl. 418—129 **4 Claims**



1. In a rotary type engine including a housing, a rotary piston operably disposed in a piston chamber in the housing and cooperative therewith for forming a plurality of operating pressure chambers each alternately pressurized and depressurized in sequential order by operation of the piston, and respective seals for sealingly isolating the several chambers, particularly the chamber being pressurized, from each other and the others, respectively, during operation, each of said seals comprising:

a. a seal strip slidably disposed in a slot cooperatively located relative to the housing and the piston, said slot having a closed end radially inwardly thereof and an outer open end opening to the piston chamber, one edge of said strip projecting from said open end of said slot to form a sealing relationship between the housing and the piston, and the opposite edge of said strip cooperating with said closed end of said slot to form a spring chamber adjacent thereto,

b. said seal strip having formed therein a plurality of bores each having one end thereof opening to said spring chamber and the opposite ends thereof opening to the piston chamber, one half to one side of said one edge of the seal strip and the other half to the other side of said one edge of the seal strip;

c. one-way check valves provided at the ends of each of said bores opening to said spring chamber; and

d. spring means disposed in said spring chamber for exerting a spring force on and urging said seal strip radially outwardly from the slot to provide said sealing relationship.

4,008,018

ROTARY FLUID DISPLACEMENT DEVICE HAVING IMPROVED PORTING

Hugh L. McDermott, 6101 Ashcroft Ave., Edina, Minn. 55424

Filed Nov. 28, 1975, Ser. No. 635,787

Int. Cl.² F04C *1/06, 15/00*

U.S. Cl. 418—171 **4 Claims**

1. In a rotary fluid displacement device comprising, a housing defining a cylindrical chamber having a cylindrical wall and axially opposite end wall means, a drive shaft journaled in the housing on an axis in spaced parallel relation to the axis of the cylindrical wall, an externally toothed star member fixed on the drive shaft, an internally toothed ring member encompassing the star member and journaled in the chamber concentric therewith, said ring member having internal teeth greater in number than the teeth of said star member and moving into and out of engagement therewith during rotation of said members on their respective axes to provide successively expanding and contracting compartments respectively, said star member and ring member each having axially opposite ends in rotary sliding engagement with said chamber end wall means; characterized by inlet and outlet ports defined by said housing in said end wall means in register with said expanding and contracting chambers respectively, and passage means leading from said ports to the exterior of the housing, said inlet port having one end defining a pair of curved portions angularly displaced from each other, the curvature of each of said portions corresponding to the curvature of a tooth portion of a different respective one of said members and coincident respectively with corresponding tooth portions of both of said members in given relative positions of rotation between said members.

4,008,019

ROTARY PUMP WITH PIVOTED FLAP ENGAGING A BLADED ROTOR

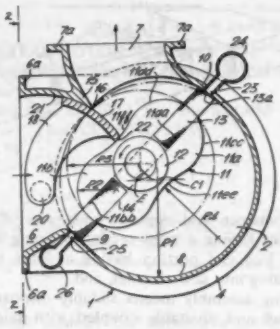
Helge Carling, Oslo, Norway, assignor to Myrens Verksted A/S, Oslo, Norway

Filed June 9, 1975, Ser. No. 584,929

Claims priority, application Norway, June 14, 1974, 742174

Int. Cl.² F01C *1/00*; F04C *1/00*

U.S. Cl. 418—221 **7 Claims**



1. A rotary pump comprising

a. a casing defining a working chamber with substantially circular cross section of a given radius (R1), and which is provided with an inlet and an outlet arranged substantially rightangled to each other and together extending across at least one quarter of the surface of the case and communicating with said working chamber,

b. a rotor eccentrically arranged in said working chamber, said rotor having two blades which are arranged in opposite recesses in a rotor boss, and which during operation are pressed against the inner surface of the working chamber, said two-bladed rotor being profiled and having a cross section along its complete length which is defined by a fixed curve which in the areas of the blade recesses have convex portions (11*cc*, 11*dd*) coinciding with approximately circularly arched portions having a first radius of curvature (R2) which is less than the smallest circumscribed circle of the cross section, and which in the areas between the blade recesses have concave portions (11*ee*, 11*ff*) coinciding with approximately circularly portions having a second radius of curvature (R4) which is less than said given radius (R1), said concave portions (11*ee*, 11*ff*) being located inside the smallest circumscribed circule of the corss section and evenly merging with said convex portions (11c, 11*dd*), and

c. a pivotable flap extending substantially along the complete width of said profiled rotor, and being arranged between the outlet and the inlet of the casing, said flap having an edge which during the rotation of the rotor slidingly abuts against said the outer surface of the rotor.

4,008,020

VANE SUPPORT ASSEMBLY FOR ROTARY TYPE POSITIVE DISPLACEMENT APPARATUS

Albert Raymond Thomas, 7313 S. Gessner, Houston, Tex. 77036

Filed May 28, 1975, Ser. No. 581,956

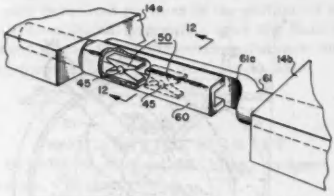
Int. Cl.² F01C *1/00*; F03C *3/00*; F04C *1/00*

U.S. Cl. 418—258 **3 Claims**

1. In a rotary type apparatus of the type including a stator housing defined by a peripheral wall and end walls defining a central chamber therein, a rotor eccentrically mounted to rotate within said central chamber, vanes adapted to reciprocate within diametrically opposed, longitudinally and radially extending slots within the wall of said rotor, and a support

assembly for structurally supporting and mounting diametrically opposed vanes with said rotor, the improvement wherein said support assembly comprises:

a. support rod means operatively coupling said diametrically opposed vanes, said supporting rod means being rigidly coupled at opposed ends to said opposed vanes and having free end portions translatably coupled at a



situs between said opposed ends, one of said free end portions having a cross-section defining a channel, the other free end portion having at least one projection extending into said channel, and

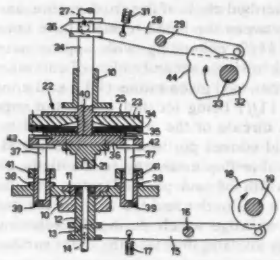
b. bearing assembly means slidably disposed within said channel and pivotably coupled with said at least one projection.

4,008,021

APPARATUS FOR FORMING A SINTERABLE COMPACT OF A POWDER

Renzo Fedrigo, Banchette d'Ivrea (Turin); Bartolomeo Borrini, Ivrea (Turin); Vittorio Garattini, Lovere (Bergamo), and Giovanni Pino, Banchette d'Ivrea (Turin), all of Italy, assignors to Schwelmer Eisenwerk Muller & Co. GmbH, Schwelm, Germany

Division of Ser. No. 272,584, July 17, 1972, abandoned, and a continuation of Ser. No. 390,137, Aug. 20, 1973, abandoned.
This application May 9, 1975, Ser. No. 576,117
Claims priority, application Italy, Aug. 10, 1971, 69685/71
Int. Cl.² B30B *11/02*
U.S. Cl. 425—3 **2 Claims**



1. An apparatus for forming a sinterable compact of a powder comprising:

a support;

a die on said support for receiving a mass of powder to be compacted;

respective rams juxtaposed with said mass on opposite sides thereof and displaceable relative to said die to compact said mass between them;

respective plates on opposite sides of said die each carrying a respective one of said rams;

respective pairs of pneumatic cylinders interposed between said support and each of said plates, said cylinders being pressurizable to displace said plates away from said support;

respective shafts displaceable on said support toward and away from said die, each of said shafts being engageable with a respective one of said plates to entrain the same toward said mass upon displacement of the respective shafts;

respective flat coils carried by said shafts and lying in planes parallel to but spaced from the respective plates, said coils being impulsively electrically energizable to electrodynamically repel the respective plates and drive said rams at a high speed against said mass; and

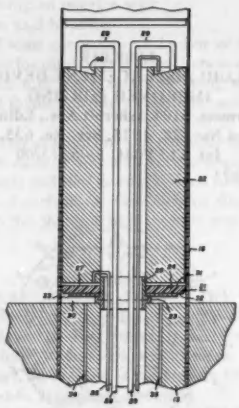
respective cam means for displacing said shafts toward said die to precompact the mass by entrainment of the plates and the rams with said shafts for compaction of said mass to a low density whereby said pneumatic cylinders thereupon move said plates away from said die and into proximity of said coils for electrodynamic displacement thereby.

4,008,022

THERMOPLASTIC TUBE SEAL AND COOLING MEANS

Philip Hugh Carrico, Greenfield Center, N.Y., assignor to General Electric Company, Hudson Falls, N.Y.

Filed Feb. 28, 1975, Ser. No. 553,934
Int. Cl.² B29D *23/04*; B29F *3/08*
U.S. Cl. 425—72 R **10 Claims**



1. In an apparatus for producing thermoplastic film comprising an extruder for extruding thermoplastic material in tubular stalk form and a coaxial cooling mandrel over which said tube passes and is cooled thereby, the improvement comprising

a. plate like seal means between said extruder and said mandrel and closely adjacent said mandrel and engaging the internal periphery of said tube,

b. said seal means defining a fluid space between said seal means and said mandrel, and between said seal means and said die,

c. fluid cooling means operatively associated with said mandrel and said seal means to continually introduce a fluid coolant in the space between said mandrel and said seal means, the seal means and mandrel diameters being proportioned so that the action of said tube in passing over said seal means draws a continuous and coextensive very thin film of fluid along said mandrel and coextensively between said mandrel and said tube, and,

d. an atmosphere control means operatively associated with said seal means and said die to continually introduce a vapor of said coolant into the space between said seal means and said die to leak past said seal and condense in said coolant,

e. and fluid collection means operatively associated with said mandrel to remove said fluid from contact with said tube before inflation thereof.

4,008,023

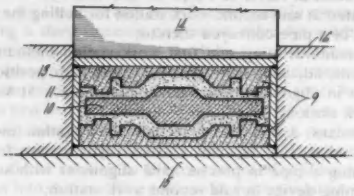
MOLD PACK FOR MAKING METAL POWDER ARTICLES

Joseph M. Wentzell, Remsen, N.Y., assignor to United Technologies Corporation, Hartford, Conn.

Continuation-in-part of Ser. No. 238,411, March 27, 1972, abandoned. This application June 24, 1976, Ser. No. 699,285

Int. Cl.² B29C *3/00*; B30B *11/00*

U.S. Cl. 425—78 8 Claims



1. A mold pack for making an article of complex inner and outer contour and substantial uniform density directly from metal powder comprising: first and second porous, compactible mold sections in opposed working relationship to define a cavity therebetween having the general outer contour of the article to be made, a porous, compactible core suspended in said cavity to define the general inner contour of said article, the cavity and core being oversized in the direction of compaction, the mold sections and core being expendable and having an initial porosity substantially equal to that of the metal powder to be compacted so that the mold sections, core and metal powder are uniformly densified when the mold pack is compacted to size, the densified metal powder forming the desired article.

4,008,024

APPARATUS FOR PRODUCTION OF GAS-PERMEABLE SEAMLESS PIPES

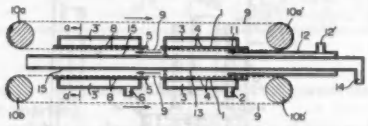
Sadaaki Yokota, Iwakuni; Shinzi Hayata, Waki, and Toshio Kaya, Iwakuni, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Dec. 2, 1975, Ser. No. 637,086

Claims priority, application Japan, Dec. 9, 1974, 49-140445; Dec. 14, 1974, 49-143053; Sept. 22, 1975, 50-113673

Int. Cl.² B29C *11/00*; B29D *23/00*; B29J *5/00*

U.S. Cl. 425—85 2 Claims



1. An apparatus for producing a gas-permeable seamless pipe structure comprising a tubular shaping screen movable in its axial direction; a suction chamber, provided upstream in the moving direction of the screen surrounding the outer wall surface of the shaping screen, for sucking the solid component of a slurry consisting of (A) 20 to 95% by weight of thermoplastic fibers, (B) 5 to 80% by weight of a component consisting of (a) 20 to 100% by weight of other fibers being infusible at the fusing temperature of the thermoplastic fibers (A) or having a higher melting point than said thermoplastic fibers (A) and (b) 0 to 80% by weight of a void-containing particulate material having an apparent density of not more than 1 and an average particle size of 20 to 20,000 microns and being infusible at the fusing temperature of the thermoplastic fibers (A), and (C) a liquid medium to the inner wall surface of the shaping screen and depositing it thereon in the form of a pipe structure; a slurry feed means for feeding the slurry onto the inner wall surface of the screen at the site of the suction chamber upstream in the moving direction of the screen; a core member in a tubular passageway formed by the shaping screen, said core member being disposed along the axial direction of the tubular passageway and at a position spaced from the inner wall surface of the shaping screen; and a heating means for withdrawing the deposited pipe structure from the terminal portion of the tubular passageway and heat-fusing the thermoplastic fibers of the pipe structure.

4,008,025

BREAD DOUGH ROUNDER BAR

Sterrett P. Campbell, Atlanta, Ga., assignor to Pak-It Mgf Co., Inc., Atlanta, Ga.

Filed Nov. 15, 1974, Ser. No. 524,085

Int. Cl.² A21C *11/00*

U.S. Cl. 425—96 2 Claims

1. Bread dough rounder bar defining a cavity along its length, said cavity varying in cross-section from an entrance end to an exit end and having a first concave work surface which decreases in height from the entrance end to a point intermediate the ends of the cavity, a flat-roofed work surface beginning at said point and proceeding toward said exit end to join a second concave work surface which increases in height from said flat-roofed surface to the exit end.

4,008,026

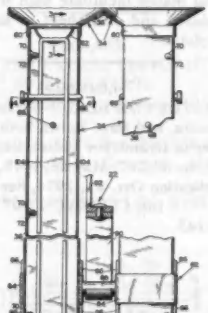
CONCRETE FORMING APPARATUS FOR MAKING FENCE POSTS AND THE LIKE

William J. Engstrom, 5608 E. 96th, Puyallup, Wash. 98381

Filed Apr. 25, 1975, Ser. No. 571,856

Int. Cl.² B28B *1/08*, *5/04*, *23/18*

U.S. Cl. 425—117 3 Claims



1. A mold for vertical forming of concrete fence posts comprising:

a. an elongate tube which is rectangular cross-sectioned, open at each end and slightly downwardly flared,

b. a bottom cap, in releasable engagement with the lower extremity of the tube having a raised center portion defining centered reinforcing rod locating means and fluid drainage means,

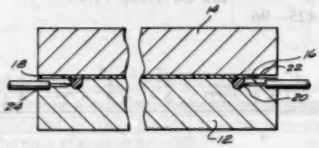
c. means releasably securing the bottom cap to the tube,
d. funnel-shaped top cap in releasable engagement with the upper extremity of the tube having paired, depending, centered, U-shaped reinforcing rod locating clips,
e. the tube having plural, paired, centered, circular openings for insertion of support hole pins and plural, paired, off-centered key shaped openings for insertion of wire slot pins.

4,008,027

APPARATUS FOR FORMING A PIPING BEAD

James K. Polk, R.D. 2, Box 307A1, Englishtown, N.J. 07726

Filed June 21, 1974, Ser. No. 481,840
Int. Cl.² B29C *1/00*; B29F *1/022*
U.S. Cl. 425—127 **5 Claims**



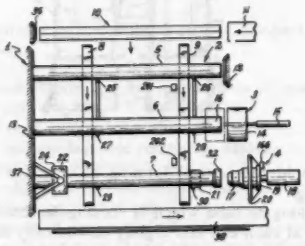
1. A device for applying a piping bead to a sheet of plastic material comprising a two piece sealing die having a mold section and a platen, said mold section having a flat sheet support surface throughout substantially its entire extent for supporting a plastic sheet thereon in a flat configuration, said flat surface cavity of generally semi-cylindrical cross-section formed therein and located in a predetermined position such that said plastic sheet is supported on said support surface over said cavity said mold section being made of RTV silicone, and means for supplying a liquefied plastic to said cavity to contact said supported sheet, said means for supplying liquefied plastic to said mold section includes an input port communicating through said mold section with said cavity a separate output port for said liquefied plastic also communicating through said mold section with said cavity, and means for providing communication between said separate outlet and inlet ports to provide for flow back of excess liquefied plastic from said separate outlet port to said inlet port; and said platen being adapted to engage the side of said sheet opposite said cavity, said platen including high frequency means for heating said plastic and said sheet in said die and cooling means in said platen.

4,008,028

APPARATUS FOR BELLING PLASTIC PIPE

Clifford P. Ronden, and Imre Rabel, both of Edmonton, Canada, assignors to Grandview Industries, Limited, Canada

Division of Ser. No. 41,267, May 28, 1970, Pat. No. 3,910,744.
This application Oct. 21, 1974, Ser. No. 516,828
Int. Cl.² B29C *17/07*
U.S. Cl. 425—145 **20 Claims**



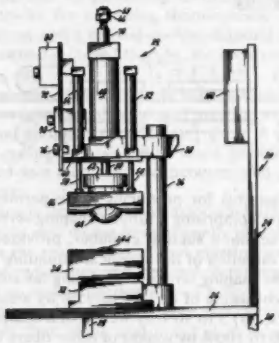
1. Apparatus for forming a bell end on a thermoplastic pipe comprising, in combination:
endless conveyor means for conveying a pipe in a direction transversely of its length;
means defining first and second work stations along said conveyor means;
heating means adjacent one side of said conveyor means at said first work station for heating, and therefore softening, an end of a pipe conveyed thereto;
a bell forming device adjacent said one side of said conveyor means, spaced from said heating means in the direction of travel of a pipe on said conveyor means and located at said second work station for belling the heated end of a pipe conveyed thereto;
said means defining said first work station including first means, adjacent said conveyor means, for positioning a pipe in alignment with said heating device at said first work station;
said means defining said second work station including second means, adjacent said conveyor means, for positioning a pipe in precise axial alignment with said bell forming device at said second work station;
means, adjacent said bell forming device and at said second work station, for providing relative axial movement, and therefore engagement, between said bell forming device and the heat softened end of the pipe to form a bell end thereon;
first control means, coupled to said first means for positioning and responsive to movement of the pipe, for actuating said first means for positioning to align the pipe with said heating means where the pipe end is heated, and for deactuating said first means to allow the pipe to leave said first work station; and
second control means, coupled to said second means and to said means for providing relative axial movement and responsive to movement of the pipe towards said second work station, for actuating said second means to align the pipe with said bell forming device, and for actuating said means for providing relative axial movement to move said bell forming device and the pipe into engagement.

4,008,029

MOLDING APPARATUS

Richard J. Shokite, Stratford, Conn., assignor to Warnaco, Inc., Bridgeport, Conn.

Filed Jan. 27, 1975, Ser. No. 544,404
Int. Cl.² B29C *3/06*
U.S. Cl. 425—157 **8 Claims**



1. A machine for molding brassiere cups and like shapes from a moldable material comprising a support, a first mold member on said support, a second mold member, means mounting said second mold member on said support for movement into and out of a molding position to said first mold member, a holddown member, means mounting said holddown member on said support for movement into and out of a material-holding position relative to said first mold member,

first pneumatic means for moving said holddown member into said material-holding position, second pneumatic means for moving said second mold member into said molding position relative to said first mold member and a control for said first and second pneumatic means including a source of air under pressure, means including a first solenoid controlled valve and an adjustable pressure regulator for establishing a first relatively low pressure line between said source and said first pneumatic means, means including a second solenoid controlled valve establishing a second relatively high pressure line between said source and said first pneumatic means, means including a third solenoid controlled valve for establishing a third relatively high pressure line between said source and said second pneumatic means, an adjustable timer, means responsive to the initiation of a timing cycle by said timer for actuating said first and third solenoid controlled valves to move said holddown member into said material-holding position under the low pressure established by said adjustable pressure regulator in timed relation to the movement of said second mold member into said molding position in mating relation with said first mold member, means operable after the elapse of a present and adjustable interval of said timing cycle to actuate said second solenoid controlled valve to apply high pressure to said first pneumatic means for the remainder of said timing cycle and means responsive to the termination of said timing cycle for moving said holddown member and said second mold member in timed relation relative to each other out of said material-clamping and molding positions relative to said first mold member.

4,008,030

DEVICE FOR MANUFACTURING BLOCKS OF POROUS THERMOPLASTIC IN A CONTINUOUS PROCESS

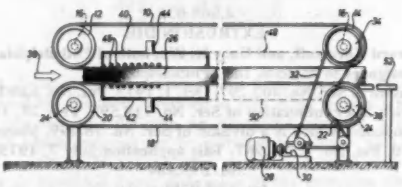
Leif Carl Gustaf Ampler, Vastra Frolunda, Sweden, assignor to Gullfiber AB, Billesholm, Sweden

Filed Sept. 22, 1975, Ser. No. 615,283

Claims priority, application Sweden, Sept. 30, 1974, 7412287

Int. Cl.² B29D *27/04*

U.S. Cl. 425—224 **2 Claims**



1. A device for manufacturing a block of porous thermoplastic, comprising

means defining an elongated channel open at both ends and through which granules containing an expanding agent are adapted to be fed continuously,

said means including at least two, endless, perforated belts mounted to have confronting portions thereof travelling in the same direction and forming two sides of said channel,

means adjacent one end of said channel defining a heating zone through which the granules introduced into the channel pass and are expanded, and

means adjacent the opposite end of said channel defining a cooling zone through which the expanded particles pass and are sintered,

said belts being made of steel and having therethrough a plurality of holes each having a diameter of less than 1 mm, and

the number of holes per m^2 of each belt amounting to a minimum of 15,000.

4,008,031

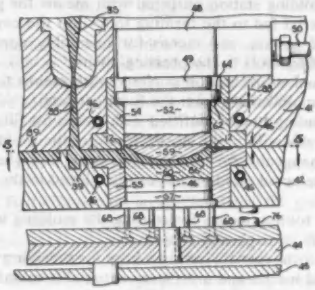
APPARATUS FOR INJECTION MOLDING LENSES

Hermann P. Weber, 5506 Beckford Ave., Tarzana, Calif. 91356

Filed Aug. 22, 1975, Ser. No. 606,774

Int. Cl.² B29D *11/00*

U.S. Cl. 425—242 R **9 Claims**



1. An apparatus for injecting molding a lens comprising:

a housing;

a pair of dies disposed within said housing and a cavity for receiving molten plastic therein;

said housing including means permitting the relative movement of said dies such that the volume of said cavity may be varied;

injection molding means communicating with said cavity for injecting plastic into said cavity;

at least one transfer pocket for receiving plastic from said cavity, said transfer pocket communicating with said cavity; and

compression means coupled to at least one of said dies, for sequentially reducing the volume of said cavity and for applying pressure to said plastic in said cavity after said plastic is injected into said cavity to transfer plastic from said cavity into said transfer pocket;

whereby molten plastic may be injected into said cavity, and then the volume of said cavity may be decreased forcing molten plastic from said cavity into said transfer pocket.

4,008,032

DEVICE FOR THE CYCLIC MANUFACTURE OF MOLDED PARTS

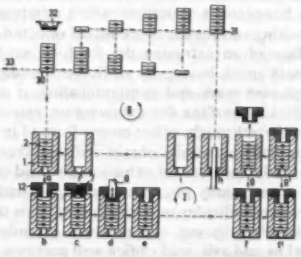
Karl-Heinz Pahl, Leuchtenberger Kirchweg 101, 4 Dusseldorf, Germany

Filed Mar. 14, 1975, Ser. No. 558,388

Claims priority, application Germany, Mar. 20, 1974, 2413317

Int. Cl.² B29C *1/16;* **B29F** *1/00;* **B29G** *3/00*

U.S. Cl. 425—246 **7 Claims**



1. A device for the cyclic manufacture of molded parts comprising:

a. a plurality of forming tools composed of a form carrier and a plurality of article-related mold inserts having cavities for the molding and being shaped for disposition of a plurality thereof in a stack in each mold carrier, the forming tool having conduit means for feeding of material to be molded to the mold insert cavities,

b. a filling station outfitted with a feeding device for feeding material to the forming tools,

c. a molding station outfitted with means for pressing the material fed to the forming tools into the cavities of the mold inserts, and means for releasably connecting the forming tools to the pressing means,

d. an unloading station outfitted with means for removing the mold inserts from the form carriers,

e. a loading station outfitted with means for filling the form carriers with mold inserts whereby the mold inserts are exchangeable for each working cycle and whereby empty preselected mold inserts can be placed in the mold carriers,

f. and routing means for routing the molding tools successively through said stations,

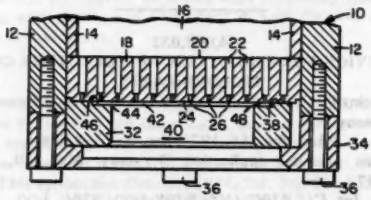
g. the form carriers having a bore for receiving the stack of mold inserts and a pressure actuatable membrane in the bore for receiving a radially acting pressure force and transferring the pressure force to mold inserts formed of radially split segments.

4,008,033

EXTRUSION MASK

Robert G. Folmar, and Robert V. VanDewoestine, both of Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Oct. 7, 1975, Ser. No. 620,360
Int. Cl.² B29F *3/04*
U.S. Cl. 425—467 **4 Claims**



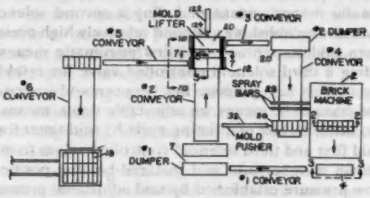
1. An extrusion mask for use in combination with die means for forming honeycomb structures which comprises, a mask having a blocking surface for blocking off selected portions of the outlet face of an extrusion die for forming honeycomb structures, said mask having an orifice extending longitudinally through said mask and communicating at an inlet end with said blocking surface for receiving an extruded honeycomb article therethrough, offset means formed in said blocking surface radially outwardly of said orifice and communicating with the outlet face of said extrusion die, said offset means including a substantially planar surface lying within a plane substantially perpendicular to a longitudinal axis through said orifice, said orifice having wall portions extending substantially parallel to said axis, said orifice wall portions joining said planar surface through a continuous curve portion, and said planar surface being offset from said blocking surface with a predetermined gap distance.

4,008,034

BRICK MAKING MACHINE HAVING STRIPPING MEANS

Joseph F. Kane, c/o Kane-Gonic Brick Corp., Gonic, N.H. 03867

Filed Oct. 1, 1975, Ser. No. 618,319
Int. Cl.² B28B *13/05*
U.S. Cl. 425—441 **7 Claims**



1. Apparatus for facilitating the removal of a mold from wet bricks therein, said apparatus comprising

a pallet,

a mold having a plurality of compartments open at top and bottom and resting on said pallet,

said compartments adapted to be filled with wet clay forming wet bricks,

a slide board resting on the top of said mold and covering all said compartments,

a slide lifter overlying said slide board,

means securing said slide board and slide lifter together,

said slide lifter having a depending end plate at each end thereof, said plates spaced from the ends of said mold and at least partially overlapping the said mold ends,

first cams on the ends of said mold,

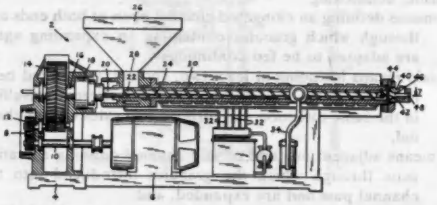
second cams on the depending end plates of said slide lifter shaped and positioned to cooperate with the said first cams on the ends of the said mold so that relative transverse movement of said slide board and slide lifter with respect to said mold will cause said first and second cams to function to achieve separation of said slide board from the top of said mold and from the upper surface of the wet bricks therein.

4,008,035

EXTRUSION DIE

Edward Korostoff, and Gary K. Zin, both of Philadelphia, Pa., assignors to Matcon, Inc., Philadelphia, Pa.

Division of Ser. No. 402,297, Oct. 1, 1973, Pat. No. 3,893,796, which is a continuation of Ser. No. 118,595, Feb. 25, 1971, abandoned, which is a division of Ser. No. 18,499, March 11, 1970, Pat. No. 3,588,987. This application July 7, 1975, Ser. No. 593,484
Int. Cl.² B29F *3/04*
U.S. Cl. 425—461 **6 Claims**



1. An extrusion die for extruding material into a desired profile comprising

a liner having a wall, the wall having an input orifice, an output orifice, an internal contour connecting the input orifice to the output orifice, a transition region of said internal contour having at a first end, a shape substan-

tially identical to the shape of the input orifice and at a second shape, a shape substantially identical to the shape of the output orifice, said region having a gradual transition in cross-sectonal orifice having a pattern, the pattern having only a 1-fold rotational axis normal to its plane, and a land portion of said internal contour having third and fourth ends, said third end corresponding to the second end of the transition portion and the fourth end corresponding to the output orifice of the liner,

a shell having an inner peripheral greater than the outer periphery of said liner wall, said shell being disposed around substantially the entire outer peripheral of said liner, and

a filling medium situated intermediate said liner and the inner periphery of said shell to substantially fill the space between said liner and said shell, whereby the filling medium may supply support to said liner.

4,008,036

DIE ASSEMBLY

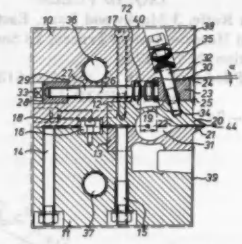
Victor Clement Vertinden, Edegem, and Victor Franciscus De Beul, Mortsel, both of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed May 29, 1975, Ser. No. 581,917

Claims priority, application United Kingdom, June 17, 1974, 26806/74

Int. Cl.² B29F *3/04*

U.S. Cl. 425—466 **12 Claims**



1. A die assembly comprising a die body section, a pair of elongated lip members mounted in said body section which have opposed lips defining an elongated slot-like orifice through which material can be extruded as a layer, said lips being constituted by spaced apart generally parallel surfaces having an extended depth dimension in the extrusion direction, at least one such lip member having a base portion affixed in said die body section, an end portion carrying said lip-forming surface, and an interconnecting neck portion of reduced cross-section which is sufficiently flexible to allow displacement of such end portion thereby to vary the spacing between said lip surfaces, said lip member end portion having an outer guide face extending along a side thereof opposite said lip-forming surface with a depth not substantially less than the depth of said lip-forming surface, said die body section having a fixed face extending thereon in spaced generally opposed relation to said guide face, said guide and fixed faces being inclined relative to one another in their depth dimension, a plurality of wedge-like adjusting members arranged in the clearance space between said relatively inclined guide and fixed faces at points spaced lengthwise thereof, each such member having opposite surfaces in mating contact with said faces, means for individually adjusting the position of said wedge-like members relative to the depth of said clearance space, and biasing means for biasing said guide face and fixed face relatively toward one another and into contact with the mating faces of said adjusting members.

4,008,037

COMPOSITIONS AND METHODS FOR HIGH TEMPERATURE STABLE CATALYSTS

Saul G. Hindin, Mendham, and Joseph C. Dettling, Jackson, both of N.J., assignors to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.

Division of Ser. No. 423,095, Dec. 10, 1973, Pat. No. 3,945,946. This application Oct. 21, 1975, Ser. No. 624,463

Int. Cl.² F23J *7/00*

U.S. Cl. 431—2 **4 Claims**

1. A method for the combustion of carbonaceous fuel comprising: forming an intimate admixture of said fuel and air; contacting said fuel air admixture with an oxidation catalyst at a temperature sufficient to combust said admixture, said catalyst having a surface area of at least 20 m^2/g after calcination for two hours at a temperature of 1200° C., said catalyst comprising: (a) a catalytically-active calcined composite of alumina and a mixture of two metal oxide components wherein the first component is selected from the group consisting of an oxide of Cr, W, and mixtures thereof and the second component is selected from the group consisting of an oxide of a Group IVB metal and mixtures thereof and (b) a catalytically-effective amount of platinum group metal deposited thereon after calcination of said composite at a temperature of at least 850° C.

4,008,038

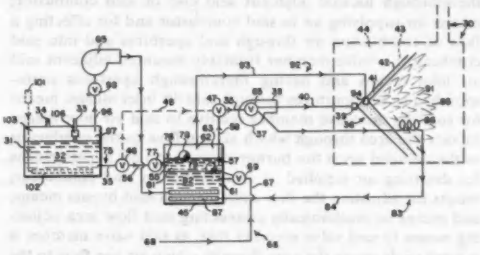
FUEL CONDITIONING APPARATUS AND METHOD

Camille J. Berthiaume, Dover, N.H., assignor to Columbia Technical Corporation, Braintree, Mass.

Filed Sept. 10, 1975, Ser. No. 612,109

Int. Cl.² F23D *11/44*

U.S. Cl. 431—11 **12 Claims**



1. In a heating system of the type having a liquid fuel tank; a heating unit with a combustion chamber; a fuel burner with a liquid fuel pump and an atomized fuel burner tip within the combustion chamber; said pump feeding fuel from said tank to said tip, the combination of:

a pressure tank in said system, said tank having a liquid fuel inlet, a liquid fuel outlet, a water inlet and a vapor outlet in the upper portion thereof;

water supply means, connecting said water inlet to a water source to fill the lower portion of said tank with water;

automatic water control means for maintaining said water at a predetermined level within said pressure tank;

liquid fuel supply means connecting said liquid fuel inlet to said fuel tank and connecting said liquid fuel outlet to said pump and tip to fill the intermediate portion of said pressure tank with liquid fuel floating on said water;

automatic liquid fuel control means for maintaining said liquid fuel at a predetermined level;

vaporized, fuel formation means comprising a liquid fuel line leading from said liquid fuel supply means, in rear of said pump and in advance of said tip; said line including a coil in said combustion chamber, in the path of the flame therein, and a perforated tube, bubbler beneath the level of said water in said tank for creating liquid fuel bubbles rising through said water and said oil to form enriched vapor in the upper portion of said tank; and

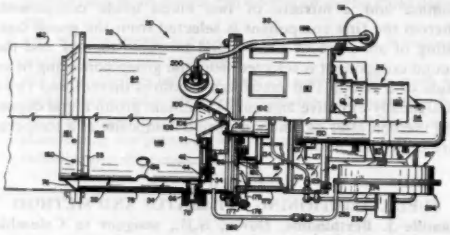
enriched vapor supply means including a vapor tip in said combustion chamber, a vapor conduit connecting said tip with the vapor outlet of said pressure tank, and air pressure supply means for maintaining predetermined pressure in said pressure tank.

4,008,039

LOW EMISSION BURNERS AND CONTROL SYSTEMS THEREFOR

William A. Compton; Thomas E. Duffy; Richard T. LeCren, and Jack R. Shekleton, all of San Diego, Calif., assignors to International Harvester Company, San Diego, Calif.

Filed May 16, 1975, Ser. No. 578,098
Int. Cl.² F23R *1/10*
U.S. Cl. 431—90 **11 Claims**



1. A low emission burner comprising: a combustor, means for injecting a liquid fuel in spray form into one end of the combustor; air inlet means having a plurality of apertures therethrough located adjacent said end of said combustor; means for supplying air to said combustor and for effecting a flow of combustion air through said apertures and into said combustor; a valve member rotatably mounted adjacent said air inlet means and having therethrough apertures corresponding to the apertures through said air inlet means; means for rotating the valve member relative to said air inlet means to vary the area through which air can flow to the combustor as the demand upon the burner changes; an air bypass means for diverting air supplied as aforesaid from said combustor; means for adjusting the flow area through said bypass means; and means so mechanically connecting said flow area adjusting means to said valve member that, as said valve member is rotated to decrease the area through which air can flow to the combustor, air is automatically diverted through said bypass means at an extent which will tend to keep the pressure drop across the valve member and the air inlet means essentially unchanged.

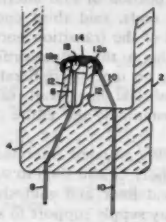
4,008,040

PHOTOFLASH LAMP AND METHOD OF MAKING SAME

Donald E. Murray, Montoursville, and Daniel W. Bricker, Williamsport, both of Pa., assignors to GTE Sylvania Incorporated, Montoursville, Pa.

Filed Nov. 24, 1975, Ser. No. 634,991
Int. Cl.² F21K *5/02*
U.S. Cl. 431—94 **9 Claims**

7. A method of making a photoflash lamp comprising:
inserting an insulating sleeve over the top portion of a first lead-in wire with the end of the wire protruding above the top end of the sleeve;
applying a flame to the protruding end of said first lead-in wire to cause said protruding end of wire to melt and provide a smooth, rounded surface of wire at the top end of the sleeve;
forming a second lead-in wire to terminate and make contact with the exterior surface of said sleeve at or near the top end thereof;
sealing said lead-in wires and the bottom end of said sleeve into one end of a length of glass tubing;
bridging the top ends of said lead-in wires within said glass tubing with primer material;
filling said glass tubing with a quantity of filamentary combustible material and a combustion-supporting gas;



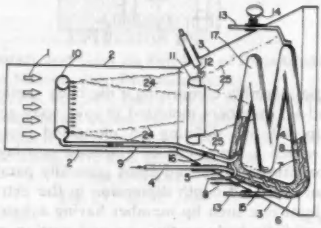
tipping off the tubing to provide an hermetically sealed envelope and
applying a protective coating on the exterior of said envelope.

4,008,041

APPARATUS FOR THE GAS PHASE COMBUSTION OF LIQUID FUELS

Gerald Alton Roffe, 3 Markwood Lane, East Northport, N.Y. 11731, and Horacio Andres Trucco, 13 Sadler Court, Huntington Station, N.Y. 11746

Filed Oct. 2, 1975, Ser. No. 618,966
Int. Cl.² F23D *11/44*
U.S. Cl. 431—247 **8 Claims**



1. An apparatus for the controlled temperature gasification of a liquid fuel, injection and mixing of the gasified fuel with air or gaseous oxidizer and combustion of that mixture comprising, in combination, a closed loop of heat transfer tubing disposed with lateral asymmetry with respect to the centerline of the apparatus, said tubing containing a heat transfer material which is a liquid at the fuel vaporization temperature, a temperature sensor within said heat transfer material, a fuel gasification tube passing through said heat transfer material, an orifice at the exit of said fuel gasification tube, a thermally insulated tube connecting the exit of said fuel gasification tube with a hollow gaseous fuel distribution ring equipped with a plurality of symetrically disposed holes, flameholder and ignition means positioned downstream of said fuel distribution ring such that the resulting flame impinges upon the heat transfer tubing, an adjustable bracket supporting said heat transfer tubing such that the position of the tubing with re-

spect to said flame may be varied so as to produce any desired temperature of the heat transfer material contained within said heat transfer tubing.

4,008,042

COAL HEATING TEMPERATURE CONTROL

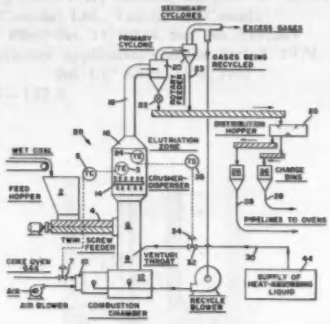
Harvey S. Auvil, Ashland, and Rufus F. Davis, Jr., Kenwood, both of Ky., assignors to Coaltek Associates, Morristown, N.J.

Continuation-in-part of Ser. No. 498,152, Aug. 16, 1974, abandoned. This application Nov. 26, 1975, Ser. No. 635,479

Int. Cl.[2] F27B *3/24*

U.S. Cl. 432—26 **15 Claims**

1. A method for maintaining equipment used for heating coal at a temperature within a temperature range normally used for heating said coal in said equipment, which comprises introducing into said equipment a heat-absorbing liquid at a rate sufficient to absorb substantially all of the heat normally absorbed by said coal when fed to such equipment and to maintain said equipment at a temperature within said temperature range maintained for heating said coal in said equipment.



V 9 5 5 5 / 3 E E 5 7 7 M

4,008,043

DIPHENYLAMINES FOR DYEING KERATINIC FIBERS

Gregoire Kalopissis, Neuilly-sur-Seine; Andree Bugaut, Boulogne-sur-Seine, and Francoise Estradier, Paris, all of France, assignors to L'Oreal, Paris, France

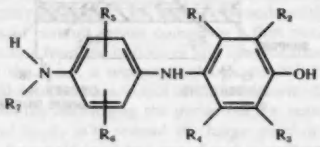
Filed Feb. 21, 1975, Ser. No. 551,627

Claims priority, application Luxembourg, Feb. 22, 1974, 69457

Int. Cl.² A61K 7/13

U.S. Cl. 8—10.2 21 Claims

1. A composition for coloring keratinic fibers comprising an aqueous or hydroalcoholic solution of at least one diphenylamine of the formula



wherein R_1 and R_4 each independently represent a member selected from the group consisting of hydrogen, halogen, lower alkyl having 1–6 carbon atoms, lower alkoxy having 1–6 carbon atoms, amino, N-lower alkyl amino wherein the alkyl moiety has 1–6 carbon atoms, N-lower hydroxy alkyl amino wherein the alkyl moiety has 1–6 carbon atoms, N-lower carbamylalkylamino wherein the alkyl moiety has 1–6 carbon atoms, acetylamino, ureido and carbalkoxyamino wherein the alkoxy moiety has 1–6 carbon atoms;

R_2 and R_3 each independently represent a member selected from the group consisting of hydrogen, lower alkyl having 1–6 carbon atoms, lower alkoxy having 1–6 carbon atoms, acelyamino and ureido;

R_5 and R_6 each independently represent a member selected from the group consisting of hydrogen, halogen, lower alkyl having 1–6 carbon atoms and lower alkoxy having 1–6 carbon atoms with the proviso that when both R_5 and R_6 are other than hydrogen at least one of R_5 and R_6 occupies a position meta to $—NHR_7$; and

R_7 represents a member selected from the group consisting of alkyl having 1–6 carbon atoms, hydroxyalkyl having 1–6 carbon atoms, amino alkyl having 1–6 carbon atoms, acetylamino alkyl wherein the alkyl moiety has 1–6 carbon atoms and mesylamino alkyl having 1–6 carbon atoms, said diphenylamine being present in an amount effective to color said keratinic fibers.

4,008,044

TREATMENT OF POLYESTER TEXTILES TO IMPROVE SOIL RELEASE AND WETTABILITY PROPERTIES

Bruce M. Latta, Bloomingdale, and Ildo E. Pensa, Palisades Park, both of N.J., assignors to J. P. Stevens & Co., Inc., New York, N.Y.

Filed June 3, 1975, Ser. No. 583,499

Int. Cl.² D06M 1/10

U.S. Cl. 8—115.5 2 Claims

1. A continuous process for imparting soil release properties to fabric consisting essentially of polyester, said process comprising

A. Applying to said fabric about 70 to 90% by weight based on the weight of said fabric of an aqueous solution containing 0.5 to 2.5% by weight of NaOH,

B. Contacting said fabric having said aqueous solution thereon with saturated steam for a period of 10 to 90 minutes while maintaining the moisture content of the fabric within the range of 35 to 120% by weight based on the weight of the fabric to remove about 0.4 to 2.5% by weight of the polyester in the fabric and

C. Washing said fabric with water to remove any unreacted NaOH.

4,008,045

ULTRA-VIOLET STERILIZER HAVING A FLUID FLOW DIFFUSER PLATE

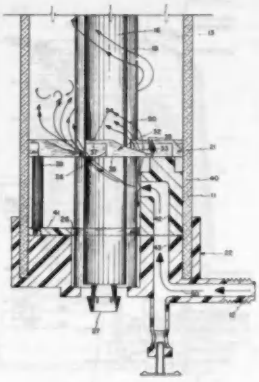
David Free, Vancouver, Canada, assignor to Naturvard Research (Canada) Ltd., Vancouver, Canada

Filed Oct. 11, 1974, Ser. No. 514,269

Claims priority, application Canada, Oct. 3, 1974, 210733

Int. Cl.² A61L 3/00, 3/02

U.S. Cl. 21—102 R 1 Claim



1. In a fluid sterilization apparatus having a chamber defined by the space between an outer cylindrical housing and an ultraviolet radiation source coaxially mounted therein, the radiation source irradiating fluid flowing in the chamber from a source of fluid, and a fluid inlet channel at one end and a fluid outlet channel at the other end of the chamber, the improvement comprising: fluid flow deflector means having a chamber inlet orifice connecting said chamber to the inlet channel and disposed perpendicular to the longitudinal axis of and in close proximity to a portion of the radiation source, said portion of the radiation source being in the flow path of fluid emerging from said inlet orifice such that fluid flowing from the source of fluid through the inlet channel and emerging from the inlet orifice strikes a portion of the radiation source and is deflected into non-coincident flow paths in said chamber, and an annulus shaped device extending substantially transversely to and being coaxial with the longitudinal axis of the ultraviolet source and positioned in the chamber between the radiation source and the cylindrical housing, the annulus device having a plurality of rigid non-overlapping vanes and being positioned downstream of but in close proximity to the inlet orifice, each of said vanes being essentially in the form of a step extending in the direction of the longitudinal axis of the radiation source, said step being formed by first and second horizontal treads interconnected by a vertical riser, said first tread being spaced axially upstream of said second tread, and wherein said step is further formed by a concave surface extending between the leading edges of the first and second treads, said leading edges being those edges of the downstream portion of each tread which first contact the inflowing fluid, whereby said concave surface is integral with said vertical riser and said first tread, such that the fluid deflected into non-coincident flow paths in said chamber after striking the radiation source, passes over the concave surfaces of the vanes and is directed thereby into turbulent rotational paths flowing downstream through the chamber toward the fluid outlet channel.

4,008,046

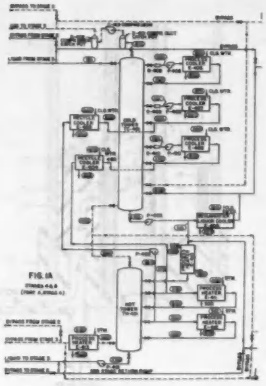
DUAL TEMPERATURE EXCHANGE APPARATUS

Jerome S. Spevack, New Rochelle, N.Y., assignor to Deuterium Corporation, White Plains, N.Y.

Division of Ser. No. 126,623, March 22, 1971, Pat. No. 3,872,223. This application Aug. 14, 1974, Ser. No. 497,451

Int. Cl.² B01D *11/04*; C01B *4/00*

U.S. Cl. 23—270.5 W 10 Claims



1. In an apparatus for producing a fluid phase containing a first material concentrated therein, by exchanging at two different temperatures said first material with a second material between chemically different first and second fluid phases which are physically separable from each other and which are each capable of containing each of said materials, said apparatus being of the type which comprises:

a. first and second direct contact exchange units forming a pair,

b. means connected to said exchange units for passing said second fluid phase through each of said second and first exchange units, in that order, of said pair,

c. means connected to said exchange units for causing said first fluid phase to flow in countercurrent contact with said second fluid phase in each of said first and second units of said pair,

d. means, comprising cooling means for one of said units and heating means for the other of said units, for maintaining said first and second units at different temperatures to cause (1) said second fluid phase to become progressively enriched in said first material in said second unit, and to become progressively impoverished in said first material in said first unit of said pair; and (2) said first fluid phase to become progressively enriched in said first material in said first unit and to become progressively impoverished in said first material in said second unit of said pair of units, and

e. means connected to said units for withdrawing from the apparatus at least one enriched fluid passing from said units,

the improvement which comprises, in combination with the foregoing,

f. means connected to said second unit for increasing the proportionate amount of first fluid phase in contact with the second fluid phase in a part of said second unit upstream, in relation to said first fluid phase flow, of said means (f), and

g. means connected to said first unit for decreasing the proportionate amount of first fluid phase in contact with the second fluid phase in a part of said first unit upstream, in relation to said first fluid phase flow, of said means (a).

4,008,047

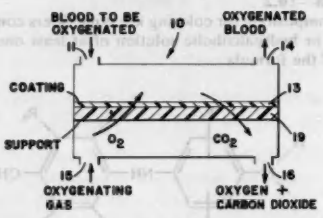
BLOOD COMPATIBLE POLYMERS FOR BLOOD OXYGENATION DEVICES

Robert J. Petersen, Minneapolis, Minn., assignor to North Star Research Institute, Minneapolis, Minn.

Filed Dec. 26, 1974, Ser. No. 536,397

Int. Cl.² A61M *1/03*; B01D *39/18*

U.S. Cl. 23—258.5 M 5 Claims



1. In a blood oxygenation device comprising a means for bringing blood into contact with a gas-permeable support means and a means for conveying oxygenating gas to the other side of the gas-permeable support means, the improvement which comprises: a coating comprising fluoroacylated ethyl cellulose as a gas-permeable coating on said gas-permeable support means and for being in contact with the blood; wherein said fluorinated ethyl cellulose has a calculated chemically combined fluorine content of at least about 10% by weight and a degree of substitution ranging from about 1.0 to about 2.75, and wherein substantially all residual hydroxyls, including ring-substituted hydroxyls, have been converted to fluorinated ester groups of the formula $-OCO(CF_2)_mCF_3$, wherein m is a number ranging from 1 to 6; said fluoroacylated ethyl cellulose containing, at most, trace amounts of residual hydroxyl groups as determined by infrared analysis.

4,008,048

INSTALLATION FOR THE DISCONTINUOUS PRODUCTION OF POLYETHYLENE TEREPHTHALATE

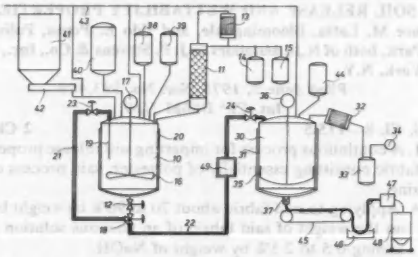
Ludovicus Maria Hellemans, Boechout; Roger Isidoor De Sadeleer, Edegem, and Johannes Maria Verheyen, Borsbeek, all of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed July 3, 1974, Ser. No. 485,620

Claims priority, application United Kingdom, July 6, 1973, 32237/73

Int. Cl.² B01J *1/00*; C08G *63/00*

U.S. Cl. 23—260 5 Claims



1. In a polyesterification unit including an esterification vessel equipped for reflux distillation and having an agitator therein, means for supplying esterification reactants to said vessel, means for collecting the by-products of said esterification, means for adjusting the temperature and pressure in said esterification vessel, a polycondensation vessel equipped with an agitator, means for adjusting the temperature and pressure

in said polycondensation vessel, means for collecting the by-products of polycondensation, means for removing polyester from said polycondensation vessel, and conduit means communicating between said vessels, the improvement of a dual purpose unit adapted for selectively producing said polyester by a) a first reaction scheme whereby dimethyl terephthalate and ethylene glycol are reacted batchwise in said esterification vessel to form bis(2-hydroxyethyl)-terephthalate which is polycondensed in said polycondensation vessel or b) a second reaction scheme whereby terephthalic acid is esterified batchwise with ethylene glycol in the presence of previously formed bis(2-hydroxyethyl)-terephthalate to form a precondensate, a portion of the precondensate is recycled for further esterification, and the balance of the precondensate is polycondensed in said polycondensation vessel, wherein said conduit means comprises a first discharge conduit extending from the bottom of said esterification vessel for emptying the same, a second discharge conduit terminating within said esterification vessel at a level intermediate its top and bottom for discharging the portion of the vessel contents above said level, said second discharge conduit extending upwardly from said level and out of said esterification vessel, valve means for selectively placing either of said discharge conduits in communication with said polycondensation vessel, and means for pressurizing the interior of said vessel to expel said portion of its contents through said second discharge conduit.

4,008,049

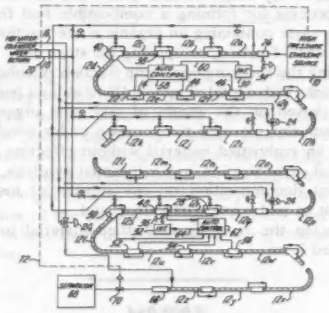
APPARATUS FOR CONTROLLING OPERATIONAL PARAMETERS IN POLYMERIZATION EQUIPMENT

Clyde C. Clemmer, and Ward C. Alcorn, III, both of Odessa, Tex., assignors to Dart Industries Inc., Los Angeles, Calif.

Division of Ser. No. 53,355, July 9, 1970, abandoned. This application Oct. 30, 1972, Ser. No. 302,309

Int. Cl.[2] B01J *3/04;* C08F *110/02;* C08G *85/00*

U.S. Cl. 23—288 H 20 Claims



1. In apparatus comprising a source of materials and an elongated reaction system receiving said materials from said source and in which a process involving said materials takes place, there being in said reaction system a plurality of zones to each of which said source supplies at least one of said materials and in each of which a critical temperature occurs which is related to said process, the improvement comprising for each such zone first means responsive to the critical temperature therein substantially independently of the displacement of same for generating a signal representative of said critical temperature and second means responsive to said signal to control the supply of at least one of said materials to said zone, wherein said first means includes a plurality of heat-sensitive elements at spaced positions along said zone to generate signals in accordance with the temperatures at said positions and selection means coupled to said elements so as to select therefrom the signal representative of said critical temperature.

4,008,050

APPARATUS FOR COMBINING OXYGEN AND HYDROGEN

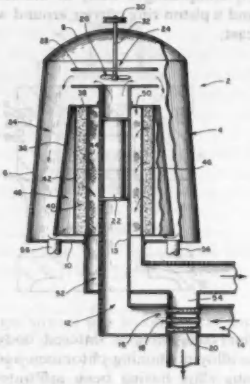
Erwin C. Betz, 524 Mill Valley Road, Palatine, Ill. 60067

Filed June 11, 1975, Ser. No. 585,741

The portion of the term of this patent subsequent to June 18, 1991, has been disclaimed.

Int. Cl.[2] B01J *8/04;* G21F *9/02;* C01B *5/00*

U.S. Cl. 23—288 R 10 Claims



1. An apparatus for recombining oxygen and hydrogen comprising:

a long, centrally disposed, tubular passageway;

an initial catalyst chamber within the passageway contained a catalyst capable of recombining oxygen and hydrogen;

means for delivering a gas stream containing hydrogen and oxygen to the tubular passageway;

a generally annular final catalyst chamber containing a catalyst capable of recombining oxygen and hydrogen, the final catalyst chamber extending over a significantly greater length than the initial catalyst chamber and surrounding the tubular passageway in a spaced apart relationship therewith so that a gas flow channel is formed between the tubular passageway and final catalyst chamber;

means for removing the gas stream from the tubular passageway after the gas stream has passed through the initial catalyst chamber and for delivering the gas stream to one of the long sides of the final catalyst chamber so that the gas stream flows radially through the final catalyst chamber in a direction generally perpendicular to the direction of flow of the gas stream through the initial catalyst chamber;

and outlet means for removing the gas stream from the apparatus after it has passed radially through the final catalyst chamber.

4,008,051

COMPOSITE METAL ARTICLES

Terence M. Cadle, Coventry, England, assignor to Brico Engineering Limited, England

Filed Aug. 27, 1975, Ser. No. 608,098

Claims priority, application United Kingdom, Sept. 11, 1974, 39560/74

Int. Cl.[2] B22D *19/00;* B22F *7/08*

U.S. Cl. 29—182.3 24 Claims

1. A metal article comprising

a body of aluminum or aluminum alloy,

an insert in said body for increasing the load-bearing or wear-resistance capacity of the article,

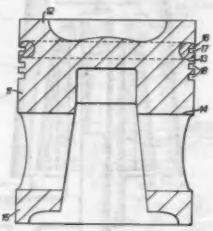
the insert comprising a sintered body of an austenitic ferrous alloy containing chromium and nickel,

the ferrous alloy having been infiltrated with copper or copper-base alloy during or after sintering of the body, and

the body having been cast around the insert, the insert having been thereby bonded to the body over substantially the whole of its surface which is in contact with the body.

13. A metal article in the form of a piston for an internal combustion engine,

the piston comprising a body of aluminum or aluminum alloy and a piston ring carrier around which the body has been cast,



the carrier comprising a sintered body of an austenitic ferrous alloy containing chromium and nickel,

the ferrous alloy having been infiltrated with copper or copper-base alloy during or after sintering of the body.

14. A method of manufacture of an aluminum or aluminum alloy article incorporating a ferrous alloy insert comprising the steps of

compacting and sintering a powder to form a sintered body of an austenitic ferrous alloy containing chromium and nickel,

infiltrating the ferrous alloy either simultaneously or in a subsequent step with copper or copper base alloy, and

casting the aluminum or aluminum alloy around the insert.

4,008,052

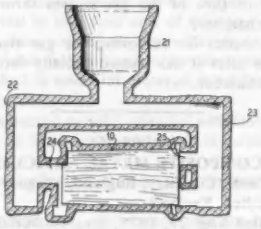
METHOD FOR IMPROVING METALLURGICAL BOND IN BIMETALLIC CASTINGS

Constantine Vishnevsky, Solon, and Lawrence D. Graham, North Canton, both of Ohio, assignors to TRW Inc., Cleveland, Ohio

Filed Apr. 30, 1975, Ser. No. 572,964

Int. Cl.² B23P *3/00*

U.S. Cl. 29—194 **14 Claims**



1. In the method of making a bicast article in which a solid metal preform is positioned in a mold and a molten metal is cast about the portions of said preform exposed in said mold, the improvement which comprises coating said exposed portions prior to the casting step with a boron containing alloy having a melting range below the melting range of either said preform or said cast metal, fusing said alloy into said preform without significant interalloying with the metal preform, said alloy having a major ingredient the same as the major ingredient of at least one of the metals to be joined, and heat treating the resulting bicast article after solidification of the molten metal at a temperature below the melting range of either said preform or the solidified metal to cause diffusion of boron into the preform and into the solidified metal.

14. A composite metallic article comprising a first nickel base superalloy bonded to a second nickel base superalloy through an intermediate bonding zone of a nickel base alloy containing boron, both said first and second nickel base superalloys having boron diffused therein from said bonding zone, and the interface between said first and second superalloys with said bonding zone being characterized by small columnar grains extending perpendicular to said interface.

4,008,053

PROCESS FOR TREATING ORGANIC WASTES

Richard S. Brenneman, Natick, and John J. Clancy, Westwood, both of Mass., assignors to Combustion Equipment Associates, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 456,338, March 29, 1974, Pat. No. 3,961,913. This application Mar. 11, 1975, Ser. No. 557,433

The portion of the term of this patent subsequent to June 8, 1993, has been disclaimed.

Int. Cl.² C10L *9/02, 5/00*

U.S. Cl. 44—1 D **50 Claims**

1. A process for embrittling the solid organic waste fraction of a solid waste material characterized by the treating of said organic waste fraction with a total of up to 11% of at least two mineral acids based on the weight of said solid organic waste fraction and at elevated temperature, the quantity of said acid and the time and temperature of said treating being such as to form an embrittled material, readily reducible to a finely divided form, without any substantial carbonization, any substantial pyrolysis, any substantial decomposition or any substantial loss in dry weight of said solid waste fraction.

27. A process for forming a combustible fuel from solid municipal waste containing an organic waste fraction and an inorganic waste fraction, comprising the steps of

a. treating the solid organic waste fraction of solid municipal waste with a total of up to 11% of at least two mineral acids based on the weight of said solid organic waste fraction and elevated temperature under conditions to form an embrittled material without effecting any substantial carbonization, any substantial pyrolysis, any substantial decomposition or any substantial loss in dry weight of said waste component; and

b. reducing the resulting embrittled material to a finely divided form.

4,008,054

PROCESS FOR MAKING LOW-SULFUR AND LOW-ASH FUELS

James T. Clancey; Everett Gorin; Eric H. Reichl, and Charles H. Rice, all of Pittsburgh, Pa., assignors to Consolidation Coal Company, Pittsburgh, Pa.

Filed Jan. 10, 1975, Ser. No. 540,310

Int. Cl.² C10L *5/00;* **C10G** *1/00*

U.S. Cl. 44—10 R **7 Claims**

1. In a coal conversion process which includes extraction of coal by a solvent to yield a mixture of coal extract, solvent and undissolved ash- and sulfur-containing hydrocarbonaceous residue, the IMPROVEMENT which comprises:

a. subjecting said coal to solvent extraction and hydrotreatment in a coal liquefaction zone under hydrodesulfurizing conditions whereby said coal extract has a lower organic sulfur content than said coal;

b. separating the effluent mixture from said coal liquefaction zone into at least two parts, the first part being a low solids-containing product containing coal extract and the

second part being a high solids-containing product containing undissolved ash- and sulfur-containing hydrocarbonaceous residue;

c. forming low-ash and low-sulfur pellets from a mixture consisting essentially of coal extract contained in said first part and carbonaceous solids;

d. subjecting said second part to distillation to yield a hydrocarbonaceous ash-containing solid and a hydrocarbonaceous distillate including solvent;

e. reacting said hydrocarbonaceous ash-containing solid with steam in a gasification zone to yield a gaseous product and ash; and

f. treating said gaseous product from said gasification zone to yield a methane-rich gas and hydrogen for use in said liquefaction zone.

4,008,055

ABRASIVE WHEEL CONTAINING NICKEL COATED NEEDLE-SHAPED CUBIC BORON NITRIDE PARTICLES

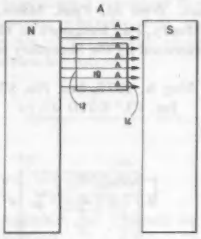
Cornelius Phaal, Robant Lane, Edenburg, Rivonia, Sandton, Transvaal, South Africa

Filed Feb. 28, 1975, Ser. No. 554,121

Claims priority, application South Africa, Mar. 7, 1974, 74/1474

Int. Cl.² B24D *3/28*

U.S. Cl. 51—298 R **1 Claim**



1. A grinding wheel comprising a hub portion and a peripheral grinding portion, the peripheral grinding portion comprising a resin matrix selected from phenolformaldehyde and polyimide resins containing nickel coated needle-shaped cubic boron nitride particles, each particle having a long axis and a transverse short axis, the nickel coating comprising from 30 to 80 weight percent of the coated particle and a substantial portion of the particles being so aligned that their long axes are substantially normal to the working face of the grinding portion.

4,008,056

SCRUBBER SYSTEM FOR REMOVING GASEOUS POLLUTANTS FROM A MOVING GAS STREAM BY CONDENSATION

George Potter, 680 "F" St., Eastside, Oreg. 97420

Filed Sept. 29, 1975, Ser. No. 617,598

Int. Cl.² B01D *47/12*

U.S. Cl. 55—92 **8 Claims**

6. A method of removing gaseous non-aqueous pollutants from a moving stream of gas comprising the steps of:

a. receiving through the base of a first upright chamber a moving gas stream containing said non-aqueous pollutants in vapor form;

b. imparting an upwardly directed cyclonic motion to said gas stream within said first chamber;

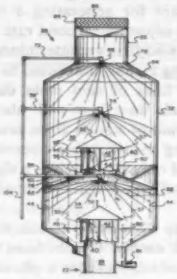
c. condensing a portion of said pollutant vapors to liquid form within said chamber by exposing said moving gas stream to a water spray having a temperature less than the condensation temperature of said pollutants and thereby cooling said pollutants to their condensation temperature by the transfer of heat from said pollutants to said water spray;

d. capturing the resultant liquified pollutants within said first chamber by contacting said liquified pollutants with the water from said water spray;

e. conducting said moving gas stream from the top of said first chamber into the base of a second upright chamber;

f. further imparting an upwardly directed cyclonic motion to said gas stream in said second chamber;

g. condensing the remaining portion of said pollutant vapors to liquid form within said second chamber by exposing



said moving gas stream to a second water spray having a temperature less than the condensation temperature of said remaining portion of pollutants and thereby cooling said remaining pollutants to their condensation temperature by the transfer of heat to said second water spray;

h. capturing the resulting liquified pollutants within said second chamber by contacting said liquified pollutants with the water from said second water spray; and

i. collecting said water with said liquified pollutants contained therein from said respective chambers and exhausting said gas stream from said second chamber.

4,008,057

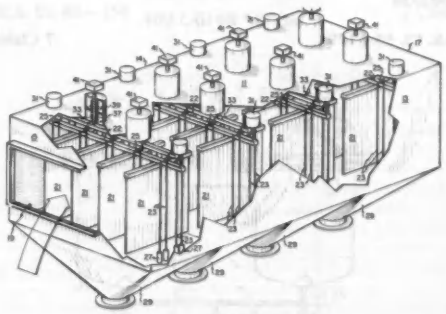
ELECTROSTATIC PRECIPITATOR ELECTRODE CLEANING SYSTEM

Peter C. Gelfand; Richard A. Carpenter, both of Lebanon, and Jerry F. Shoup, Palmyra, all of Pa., assignors to Envirotech Corporation, Menlo Park, Calif.

Filed Nov. 25, 1974, Ser. No. 526,990

Int. Cl.² B03C *3/66*

U.S. Cl. 55—105 **12 Claims**



1. In an electrostatic precipitator having electrically-activated rappers arranged in a plurality of modules that operably extend transverse to the gas flow direction through the electro-static precipitator, each of said modules comprising a plurality of rappers connected in parallel across associated busses, and each of said rappers having an electrically-operated normally-open switch connected thereto to control

the flow of electricity to the rapper from the associated buss; and each of said rappers being connected to shake an electrode of the precipitator to dislodge particulates therefrom, a system for operating the rappers the improvement comprising:

a. a main distributor circuit including a plurality of output lines, said main distributor circuit operating to place an electrical signal on each one of said output lines in sequence and to the exclusion of the other said output lines at a first predetermined rate;

b. a plurality of control circuits, each said control circuit associated with a particular one of said modules and each said control circuit including:

i. a timer means for generating a continuous train of signals at an adjustable second rate that is substantially slower than said first predetermined rate;

ii. synchronizing means connected to a particular one of said output lines of said main distributor circuit to receive signals therefrom and, also, connected to receive said train of signals from said timer means, said synchronizing means being operative to generate an output signal only if it receives a signal from said timer means followed by a signal from said main distributor circuit; and

iii. a secondary distributor circuit that is connected to receive said output signals from said synchronizing means and which includes a plurality of output lines, each of said secondary distributor output lines being connected to a said switch of a particular one of said rappers in the associated module, said secondary distributor circuit being operative to place an electrical output signal on each of its said output lines in an ordered sequence and to the exclusion of the other of its said output lines, each sequential placement being made upon the receipt of an output signal from said synchronizing means, and said electrical output signals from said secondary distributor circuit being operative to close the switch of the rapper which receives the signal to activate that rapper with power from said associated buss.

4,008,058

APPARATUS FOR REGENERATING A DRYING AGENT IN DRIERS FOR GASES OR AIR UNDER POSITIVE PRESSURE

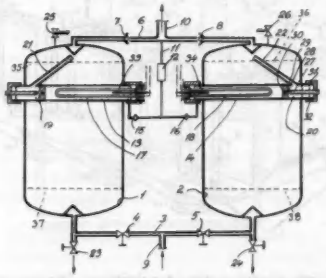
Karl Wischer, Alaryds mellangard, 560 10 Skillingaryd, and Kjell Eric Ericsson, Bruksgatan 30, 560 12 Vaggeryd, both of Sweden

Filed Mar. 17, 1976, Ser. No. 667,805

Claims priority, application Sweden, Mar. 18, 1975, 7503034

Int. Cl.² B01D *53/04*

U.S. Cl. 55—179 **7 Claims**



1. Apparatus for regenerating a drying agent in driers for gas under positive pressure, said apparatus comprising

a. two drying towers, each tower having upper and lower ends, respectively,

b. a drying agent disposed in each of said drying towers,

c. means for interconnecting said drying towers by their respective upper ends and lower ends,

d. valve means in said interconnecting means,

e. means for supplying to one of said interconnecting means compressed gas to be dried,

f. means for expelling from the other of said interconnecting means dried compressed gas,

g. hollow cartridge means extending diametrically through each of said drying towers, said cartridge having choke means at the output thereof,

h. heating means disposed in each of said cartridge means,

i. feedback means from the interconnectng means for expelling dried compressed gas from each of said drying towers to the respective cartridge means, and

j. valve means in said feedback means, whereby moist, compressed gas introduced at one end of a first one of said drying towers is expelled at the other end of said drying tower and a lesser portion of this dried gas is fed back as regenerating gas to the cartridge means of the second drying tower and heated therein and is discharged from said cartridge means through said choke means for flowing through the entire drying agent of the second drying tower for drying said drying agent of the second drying tower.

4,008,059

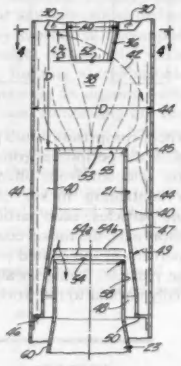
CENTRIFUGAL SEPARATOR

Donald R. Monson, West St. Paul, Minn., and Thomas E. Rosendahl, McMurry, Pa., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 6, 1975, Ser. No. 574,975

Int. Cl.² B01D *45/14*

U.S. Cl. 55—396 **2 Claims**



1. A miniature centrifugal separator comprising a cylindrical imperforate main flow tube having an upstream end for receiving a stream of dust-laden gas, and a downstream end for discharging concentrated dust;

swirl means within the upstream end of the main flow tube for imparting centrifugal force to the dust particles in the dust-laden gas; said swirl means comprising a hub coaxially located in the main flow tube, and helical vanes extending outwardly from said hub at acute angles to the tube axis; the hub diameter being approximately 40% of the main flow tube diameter, and the swirl vanes being angled to the flow tube axis at approximately 65°; said hub having a frusto-conical tail extending downstream beyond the trailing edges of the vanes for a distance that is slightly less than one third the diameter of the main flow tube;

a first separator tube coaxially located within the main flow tube downstream from the swirl means; said first separa-

tor tube comprising a leading cylindrical section and a trailing frusto-conical section flaring outwardly from its point of connection with the cylindrical section; the cylindrical section of the first separator tube having a diameter that is approximately 1.4 times the hub diameter; the cylindrical section of the first separator tube defining an annular flow separator edge (53) that is spaced downstream from the swirl vanes by a distance that is approximately the same as the diameter of the main flow tube;

wall means (50) joining the first separator tube to the main flow tube; said wall means having at least one opening therethrough defining a first dust scavenger port;

a second separator tube coaxial with the main flow tube and downstream from the first separator tube; said second separator tube comprising a leading cylindrical section and a trailing frusto-conical section flaring outwardly from its point of connection with the cylindrical section; the cylindrical section of the second separator tube having approximately the same diameter as the cylindrical section of the first separator tube;

the cylindrical section of the second flow separator tube defining an annular flow separator edge (54) that cooperates with the inner surface of the frusto-conical section of the first separator tube to define a second dust scavenger port; the second separator tube being telescoped into the first separator tube so that the first scavenger port and second scavenger port having a size ratio of approximately 0.2;

and means for producing a scavenger flow force on the first and second ports, whereby dust particles are drawn through the ports while relatively clean gas flows through the second separator tube.

4,008,060

GAS FILTER

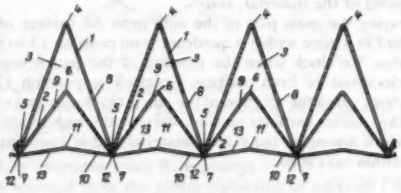
Erhard Charles Andreae, 36, Chemin de Pierrefleur, 1018 Lausanne, Switzerland

Filed Feb. 9, 1976, Ser. No. 656,141

Claims priority, application Switzerland, Dec. 4, 1975, 15783/75

Int. Cl.² B01D *45/00*

U.S. Cl. 55—446 **3 Claims**



1. A gas filter of the type comprising two walls having parallel folds, connected along certain of said folds to define therebetween chambers while allowing extension of the filter in the manner of an accordion, and perforations in each said wall staggered in relation to those of the other wall for the passage of gas through said chambers along a sinuous path, which further comprises a perforated third wall having folds parallel to those of the first two walls and being connected to the assembly of the first two walls in the regions where the first two walls are connected, with its perforations staggered in relation to those of at least one of the first two walls, said third wall having a developed length substantially less than the maximum length to which the assembly of the first two walls alone could be extended and limiting the extension of the filter to said developed length.

4,008,061

METHOD OF MAKING OPTICAL FIBER OPTICAL POWER DIVIDER

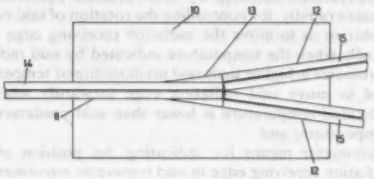
Melvin M. Ramsay, Harlow, England, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Jan. 6, 1976, Ser. No. 646,818

Claims priority, application United Kingdom, Jan. 23, 1975, 3000/75

Int. Cl.² C03C *23/20*; G02B *5/14*

U.S. Cl. 65—4 A **4 Claims**



1. A method of making an optical fiber optical power divider comprising the steps of:

inserting a glass optical fiber having a core and cladding into a bore formed in one end of a glass block having an index of refraction in the range of less than and equal to the optical fiber cladding;

inserting a glass optical fiber having a core and cladding into each of at least two converging bores formed in an opposite end of the glass block so that the ends of the fibers inserted in said opposite end of said glass block contact an end of the fiber inserted in said one end of said glass block having an index of refraction in the range of less than and equal to the optical fiber cladding;

heating the block to a softening temperature to collapse the bores of the glass block; and

drawing said glass block to reduce the cross-section of said block proximate said fiber ends.

4,008,062

APPARATUS FOR DETECTING THE POSITION OF FLOAT GLASS

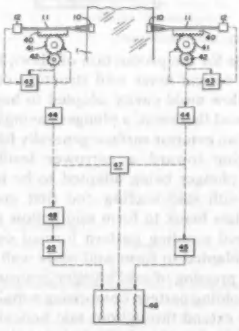
Tuneharu Nishikori; Tetsu Mori; Yasuo Kobayashi, and Kenjiro Hiyama, all of Aichi, Japan, assignors to Asahi Glass Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 519,292, Oct. 30, 1974, abandoned. This application Feb. 13, 1976, Ser. No. 658,017

Claims priority, application Japan, Oct. 30, 1973, 48-121202

Int. Cl.² C03B *18/02*

U.S. Cl. 65—158 **2 Claims**



1. An apparatus for detecting the position of an edge of a glass ribbon being forwardly moved on a bath of molten metal in an elongate tank in a process for manufacturing a float glass, comprising:

a reciprocably movable radiation receiving edge of a radiation pyrometer being disposed for movement transversely above said floating glass ribbon,

a control motor for reciprocably moving said radiation receiving edge of said pyrometer, having a gear interlocked with a rack mounted on said supporting rod;

an electronic temperature controller, having means for receiving temperature information from said radiation receiving edge and a setting index set at a predetermined temperature in the temperature range where apparent temperatures indicated by said radiation pyrometer increases rapidly, for controlling the rotation of said control motor so as to move the radiation receiving edge backwardly when the temperature indicated by said radiation pyrometer is higher than said predetermined temperature and to move said radiation edge forwardly when the indicated temperature is lower than said predetermined temperature; and

potentiometer means for indicating the position of said radiation receiving edge in said transverse movement as a measure of the position of the edge of the floating glass ribbon, said potentiometer having a gear interlock with the gear of said control motor.

4,008,063

APPARATUS FOR PRODUCING BLOWN HOLLOW GLASS OBJECTS

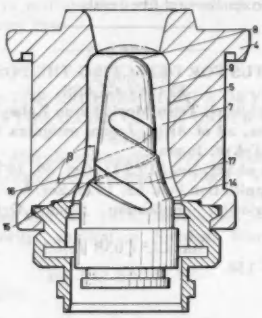
Heinz Krämer, Oldenburg; Norbert Peretti, Mulheim, Ruhr, and Helmut Waschneck, Dusseldorf, all of Germany, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed June 10, 1975, Ser. No. 585,655

Claims priority, application Germany, June 26, 1974, 2430656

Int. Cl.² C03B *11/00*

U.S. Cl. 65—305 **4 Claims**



1. Apparatus for the production of blown hollow glass bodies having an optical inner wall structure comprising means defining a hollow mold cavity adapted to have a heated glass blank introduced thereinto, a plunger having a central longitudinal axis and an exterior surface generally formed in a configuration tapering toward a narrower leading end of said plunger, said plunger being adapted to be inserted into said mold cavity with said leading end first and to be pressed against said glass blank to form said hollow glass body, and a helically shaped molding pattern formed on the exterior of said plunger adapted to form said inner wall structure of said glass body by pressing of said plunger against said glass blank, said helical molding pattern comprising a main pattern surface configured to extend throughout said helical molding pattern at an angle of not less than 90° relative to the diameter of said plunger, said angle being taken as an exterior angle relative to the body of said plunger when the diameter from which said angle is taken is located rearwardly of said main pattern surface relative to said leading end of said plunger, said angle being taken as an interior angle relative to the body of said plunger when the diameter from which said angle is taken is located forwardly of said main pattern surface relative to said leading end of said plunger.

4,008,064

METHOD OF PAN GRANULATION

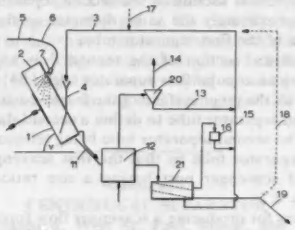
Öyvind Skauli, Porsgrunn, Norway, assignor to Norsk Hydro A.S., Oslo, Norway

Filed Feb. 12, 1975, Ser. No. 549,428

Claims priority, application Norway, July 26, 1974, 742729

Int. Cl.² C05C *13/00*

U.S. Cl. 71—28 **6 Claims**



1. In a pan granulation process for the production of low-water or substantially anhydrous nitrogenous compounds, comprising charging hot nitrogenous melt and cooled solids to an inclined rotating pan whereby, during the rotation of the pan there is formed a substantially crescent shaped bed of rolling particles having a thickness or depth which gradually increases in the direction towards the periphery of the pan and its overflowing sector, i.e. from position 2 o'clock to position 6 o'clock where the pan surface is regarded as a clock face and when the rotation of the pan is counter clockwise, or from position 6 o'clock to position 10 o'clock when the rotation of the pan is clockwise, the improvement comprising:

charging the solid material to the pan bottom surface such that downward sliding particles cover the thus charged cooler solid material;

maintaining the temperature of discharged material from the pan within a range of 4°– 25° C below the melting point of the material; and

spraying the main part of the melt onto the surface of the bed in a zone within a quadrant from position 12 to position 3 o'clock when the rotation of the pan is counter clockwise or from position 9 o'clock to position 12 o'clock when the rotation of the pan is clockwise and where the coarser particles appear, whereby the highest temperature arising in the rolling material bed is concentrated within said zone.

4,008,065

GRANULATED FERTILIZER COMPOSITION AND METHOD FOR ITS PREPARATION

Ulrich Hauschild, Hannover, Germany, assignor to Kali-Chemie Aktiengesellschaft, Hannover, Germany

Filed Feb. 14, 1975, Ser. No. 550,158

Claims priority, application Germany, Feb. 16, 1974, 2407491

Int. Cl.² C05B *7/00*

U.S. Cl. 71—34 **13 Claims**

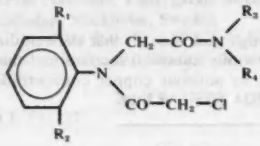
1. A granulated fertilizer composition comprising mineral phosphates calcined with alkali and between about 0.5 and 15% by weight of tetrapotassium pyrophosphate $K_4P_2O_7$.

4,008,066
PHENYLAMINOACETAMIDES FOR REGULATING PLANT GROWTH

Hans Moser, Magden, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 458,970, April 8, 1974, abandoned. This application Oct. 15, 1975, Ser. No. 622,595
Int. Cl.² A01N 9/20; C07C 103/22, 103/78
U.S. Cl. 71—76 **20 Claims**

1. A compound of the formula



(I)

wherein R_1 and R_2 each represents methyl or ethyl, or wherein R_1 represents chlorine or methoxy and R_2 represents methyl, and R_3 and R_4 each represents hydrogen, methyl or ethyl.

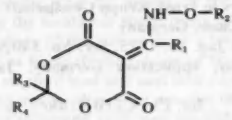
17. A method for retarding the growth of grasses and crop plants which comprises applying thereto an effective nonlethal amount of a compound according to claim **1.**

4,008,067
OXACYCLOHEXANE DERIVATIVES

Yoshihiko Hirono, Hiratsuka; Hisao Ishikawa, Odawara; Isao Iwataki, Odawara; Mikio Sawaki, Odawara; Takashi Okabe, Odawara; Daigaku Takiguchi, Tokyo, and Kuniyasu Maeda, Yokohama, all of Japan, assignors to Nippon Soda Company, Limited, Tokyo, Japan

Filed May 28, 1975, Ser. No. 581,705
Claims priority, application Japan, June 4, 1974, 49-63209
Int. Cl.² C07D 319/04; A01N 9/20
U.S. Cl. 71—88 **12 Claims**

1. A compound of the general formula



wherein

R_1 is alkyl of 1 to 3 carbon atom,

R_2 is selected from the group consisting of ethyl, allyl and propargyl,

R_3 is methyl when R_4 is methyl or ethyl,

or R_3 is hydrogen when R_4 is phenyl,

R_4 is selected from the group consisting of alkyl of 1 to 2 carbon atoms and phenyl, and

R_3 forms cyclo-alkylene of 4 to 5 carbon atoms by combining with R_4;

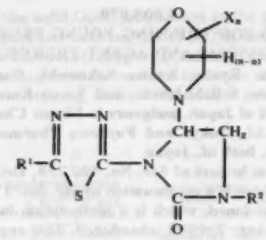
or sodium salt of the compound defined herein above.

4,008,068
1-THIADIAZOLYL-5-MORPHOLINOIMIDAZOLIDINONES

John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Filed Mar. 8, 1976, Ser. No. 665,131
Int. Cl.² C07D 417/14; A01N 9/12
U.S. Cl. 71—90 **10 Claims**

1. A compound of the formula



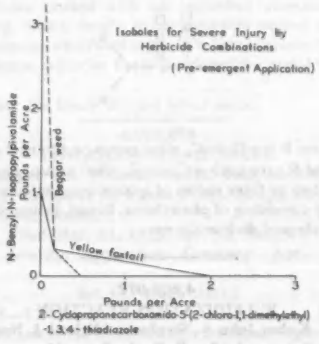
wherein R^1 is selected from the group consisting of lower aikyl, cycloalkyl of from 3 to 7 carbon atoms, lower alkenyl, lower chloroalkyl, lower bromoalky, trifluoromethyl, lower alkoxy, lower alkylthio, lower alkysulfonyl and lower alkylsulfinyl; R^2 is selected from the the group consisting of lower alkyl, lower alkenyl, lower haloalkyl and propargyl; X is selected from the group consisting of lower alkyl and halogen; and n is an integer from 0 to 2.

10. A method of controlling weeds which comprises contacting said weeds with a herbicidal composition comprising an inert carrier and, as an essential active ingredient, in a quantity toxic to weeds, a compound of claim **1.**

4,008,069
SYNERGISTIC WEED CONTROL COMPOSITION

James L. Ahle, Shawnee, Kans., assignor to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Sept. 13, 1972, Ser. No. 288,646
Int. Cl.² A01N 9/22
U.S. Cl. 71—90 **3 Claims**



1. The synergistic pre-emergent weed control composition consisting essentially of a herbicidally effective amount of a mixture of one part by weight 2-cyclopropanecarboxamido-5-(2-chloro-1,1-dimethylethyl)-1,3,4-thiadiazole and two parts by weight N-benzyl-N-isopropylpivalamide.

4,008,070

METHOD FOR THINNING YOUNG FRUITS AND BLOSSOMS AND AGENT THEREFOR

Takashi Iwata, Kyoto; Kazuo Nakanishi, Osaka; Minoru Nagao, Kyoto; Seiichi Ishida, and Yasuo Kamuro, both of Shiraoka, all of Japan, assignors to Nissan Chemical Industries Co., Ltd., Tokyo and Fujisawa Pharmaceutical Co., Ltd., Osaka, both of, Japan

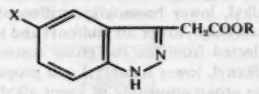
Continuation-in-part of Ser. No. 404,758, Oct. 9, 1973, abandoned, which is a continuation of Ser. No. 179,589, Sept. 10, 1971, abandoned, which is a continuation-in-part of Ser. No. 749,599, Aug. 2, 1968, abandoned. This application Apr. 29, 1975, Ser. No. 572,706

Claims priority, application Japan, Aug. 5, 1967, 42-50122

Int. Cl.² A01N *9/22*

U.S. Cl. 71—92 **10 Claims**

1. A method for thinning young fruits and blossoms, which comprises applying to fruit trees an effective amount for thinning the fruits and blossoms of an indazole compound of the formula:



wherein R is a lower alkyl having 1 to 4 carbon atoms and X is chlorine or bromine within a period of 60 days after full blooming.

4,008,071

ADDUCTS OF CARBAMOYL SULPHOXIDES

Franco Gozzo, S. Donato Milanese (Milan); Marcella Masoero, Milan; Ernesto Signorini, Malnate (Varese), and Riccardo Fabbrini, Milan, all of Italy, assignors to Montedison Fibre S.p.A., Milan, Italy

Continuation-in-part of Ser. No. 584,352, June 6, 1975, Pat. No. 3,975,180. This application Aug. 29, 1975, Ser. No. 608,976

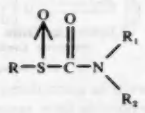
Claims priority, application Italy, Sept. 3, 1974, 26861/74

Int. Cl.² A01N *9/14*

U.S. Cl. 71—99 **6 Claims**

1. A method for combating infesting plants by incorporating or spreading on the ground adjacent thereto in a quantity of at least 0.25 kg/ha, an adduct of

a. one or two moles of a carbamoyl sulphoxide of the formula:



wherein R is a C_1 to C_4 alkyl group or a benzyl group, and R_1 and R_2 are each a C_1 to C_4 alkyl group, and

b. one, two or three moles of a compound selected from the group consisting of phenylurea, biuret, thiourea, dicyanodiamide and dichloralurea.

4,008,072

SULFIDIZATION REACTION

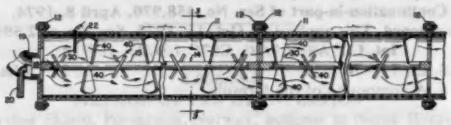
Martin C. Kuhn; John A. Stephens; Michael J. Noakes, all of Tucson, Ariz., and Allen D. Rovig, Butte, Mont., assignors to The Anaconda Company, New York, N.Y.

Filed Sept. 16, 1974, Ser. No. 506,570

Int. Cl.² C22B *15/08*

U.S. Cl. 75—1 R **6 Claims**

1. The process of sulfidizing an acidified copper leach pulp prior to flotation recovery of the copper therefrom comprising adding to and intimately admixing with said pulp in a reaction zone an ionizable sulfide material, said sulfide material being added in an amount proportional to the amount of copper in



said pulp passing through said zone so that the sulfidization reaction is completed within about 30 seconds and the pulp leaving said zone has an aqueous copper concentration of from about 0.14 to 0.024 gram per liter.

4,008,073

ALLOY POWDER FOR THE PRODUCTION OF DENTAL AMALGAM

Rudolf Kropp, Pforzheim-Wurm, Germany, assignor to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Filed Nov. 18, 1975, Ser. No. 632,953

Claims priority, application Germany, Mar. 14, 1975, 2511194

Int. Cl.² C22C *5/08*

U.S. Cl. 75—.5 R **8 Claims**

3. An alloy powder suitable for production of dental amalgams consisting essentially of 75–92% silver, 8–23% copper, 1–10% tin and 0–2% zinc, said powder being a mixture of two separate alloy powder components, the first of which is 60–95% of the total and consists of 80–92% silver, 8–20% copper, 0–8% tin and 0–2% zinc, while the second of which is 40–5% of the total and consists of 50–75% silver, 0–25% copper, 20–50% tin and 0–2% zinc.

4,008,074

METHOD FOR MELTING SPONGE IRON

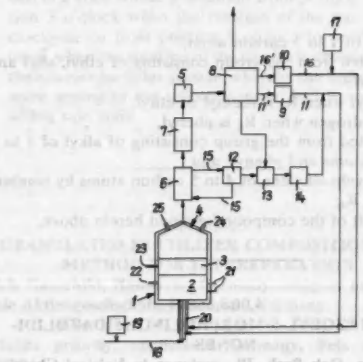
Heinrich-Otto Rossner, Essen; Dietrich Radke, Essen-Margaretenhohe, and Jürgen Hartwig, Essen-Steele, all of Germany, assignors to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed Jan. 14, 1975, Ser. No. 540,958

Claims priority, application Germany, Jan. 14, 1974, 2401540

Int. Cl.² C21B *11/00*

U.S. Cl. 75—43 **17 Claims**



1. A method for melting sponge iron comprising placing pieces or pellets of sponge iron onto the surface of a molten metal bath of iron; adding oxygen to the metal bath contained in a melting vessel at a position below the surface of the bath;

and adding to the metal bath under pressure and at a position below the surface of the bath, solid, carbonaceous dust and fine-grained sponge iron, with the oxygen and the carbonaceous dust and fine-grained sponge iron required for the melting process being introduced into the metal bath in immediate proximity to one another.

4,008,075

AUTOGENOUS SMELTING OF LEAD IN A TOP BLOWN ROTARY CONVERTER

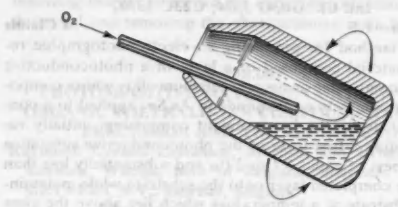
Stig Arvid Petersson, Vintergatan, Sweden, assignor to Boliden Aktiebolag, Stockholm, Sweden

Filed Dec. 12, 1974, Ser. No. 532,234

Claims priority, application Sweden, Dec. 20, 1973, 7317219

Int. Cl.² C22B *13/00*

U.S. Cl. 75—77 **11 Claims**



1. The method of autogenous production of crude lead from materials containing lead sulfide comprising the steps of

rotating at 10–60 r.p.m. a pre-heated top blown rotary converter on an axis inclined to the horizontal plane at a speed of 0.5–7 m/s measured at the inner periphery of the cylindrical part of the converter,

charging the lead sulfide containing materials into said rotating converter and simultaneously,

introducing oxygen or oxygen-enriched air into said furnace so that the sulphur in the charge is combusted and the heat thereby obtained is caused to generate a smelt of lead and a lead containing slag, said smelt of lead and said lead containing slag by means of the frictional force induced by the rotational speed being lifted up along said inner periphery of the converter to a level at which smelt falls down as finely-divided drops of liquid,

treating said smelt of lead and said lead containing salg with reducing agents so that lead content of said slag is decreased not to esceed 10%, and thereafter

tapping slag and crude lead from the furnace; said crude lead having a sulfur content not exceeding 2%.

4,008,076

METHOD FOR PROCESSING MANGANESE NODULES AND RECOVERING THE VALUES CONTAINED THEREIN

Helmut Junghanss; Wilhelm Roever, both of Duisburg; Dieter Neuschütz, Kettwig, and Ulrich Scheffler, Essen, all of Germany, assignors to Duisburger Kupferhutte, Duisburg and Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, both of Germany

Filed Jan. 15, 1976, Ser. No. 649,491

Claims priority, application Germany, Jan. 15, 1975, 2501284

Int. Cl.² C22B *15/08, 19/22, 23/04*

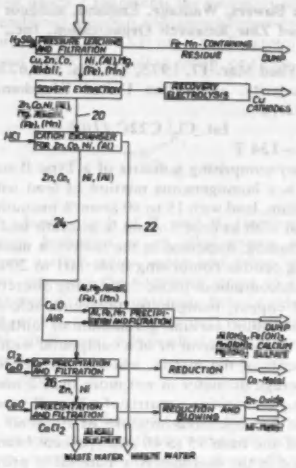
U.S. Cl. 75—101 R **28 Claims**

1. A method for processing crushed raw manganese nodules for the selective recovery of metal values of nickel, copper, cobalt and zinc contained therein, by predominantly hydrometallurgical means, comprising:

a. suspending the crushed raw nodules in water or dilute wash solution to form a suspension;

b. charging the suspension and sulfuric acid to a pressure vessel to provide an acidified solid-liquid suspension;

c. heating the solid-liquid suspension in the pressure vessel to a temperature between about 150° C and about 300° C to cause the nickel, copper, cobalt and zinc to be selectively leached from the nodules to form a metal rich leach solution containing these metals and a residue, with the solid-liquid suspension having a sulfuric acid content of less than 35 g/l upon completion of the leaching;



d. separating the metal rich leach solution containing nickel, copper, cobalt and zinc from the residue; and

e. recovering the nickel, copper, cobalt and zinc values from the separated metal rich leach solution.

4,008,077

REJUVENATION OF WASTE SILVER-LADEN SOLUTIONS

Richard A. Wallace, 3425 SW. Barbur Blvd., No. 103, Portland, Oreg. 97201

Continuation-in-part of Ser. No. 407,740, Oct. 18, 1973, abandoned. This application Dec. 24, 1975, Ser. No. 644,243

Int. Cl.² C22B *11/04, 34/32*

U.S. Cl. 75—118 P **7 Claims**

1. A method for recovering silver metal from spent silver-laden solutions which comprises:

contacting said spent silver-laden solution with with a chelating agent and finely divided mechanically worked aluminum coated with an imperfect aluminum oxide coating, which results in an induction period of at least one minute, when said solution is first contacted with said aluminum, whereby finely divided silver metal is formed; and

recovering the finely divided silver metal.

4,008,078

LOW-CARBON RAIL STEEL

Jurgen Flugge, and Wilhelm Heller, both of Rheinhausen, Germany, assignors to Firma Fried. Krupp Huttenwerke AG, Bochum, Germany

Filed Mar. 31, 1975, Ser. No. 563,982

Claims priority, application Germany, Apr. 3, 1974, 2416055

Int. Cl.² C22C *38/12*

U.S. Cl. 75—124 **11 Claims**

1. A low-carbon rail steel having a tensile strength of at least 900 N/mm² and a yield point of at least 650 N/mm² consisting essentially of:

0.07 to 0.12 weight percent carbon

0.20 to 0.50 weight percent silicon

4.50 to 5.00 weight percent manganese

0.04 to 0.12 weight percent niobium

0.007 to 0.012 weight percent nitrogen

0.005 to 0.025 weight percent metallic aluminum, the balance being iron with the usual low impurities,
said steel having a Cr content less than 0.35% by weight

4,008,079

SUPERCONDUCTING ALLOYS

John Edwin Bowers, Wantage, England, assignor to International Lead Zinc Research Organization, Inc., New York, N.Y.

Filed Mar. 17, 1975, Ser. No. 558,623
Claims priority, application United Kingdom, Mar. 20, 1974, 12492/74
Int. Cl.² C22C *11/08*
U.S. Cl. 75—134 T **12 Claims**

1. An alloy comprising a matrix of a Type II superconductor, which is a homogeneous mixture of lead with 30 to 50 atom % indium, lead with 15 to 40 atom % bismuth, at least 50 atom % lead with at least 5 atom % bismuth and 10 atom % indium, including, dispersed in the matrix, a material to provide pinning centres comprising from 0.01 to 20% by volume of a stable discontinuous phase comprising discrete crystalline particles of copper, manganese, tellurium, selenium, nickel, calcium, chromium, cerium, germanium or lanthanum, either in the form of the element or of a compound with at least one of components of the matrix, wherein the discrete particles have an average diameter of not more than 2 microns.

8. An alloy comprising a matrix of a Type II superconductor which is an homogeneous mixture of from 60 to 85 atom percent lead and from 15 to 40 atom percent bismuth, including dispersed in the said matrix a material to provide pinning centres comprising from 0.01 to 20% by volume of a stable discontinuous crystalline phase of discrete particles selected from the group consisting of copper, selenium, nickel and tellurium either in the form of the element or of a compound with at least one of the components of the said matrix, wherein the discrete particles have an average diameter of not more than 0.5 microns.

4,008,080

COPPER FREE DENTAL GOLD ALLOYS

Ewald Wagner, Pforzheim, Germany, assignor to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Filed Nov. 4, 1975, Ser. No. 628,766
Claims priority, application Germany, Nov. 13, 1974, 2453799
Int. Cl.² C22C *5/02*
U.S. Cl. 75—134 N **9 Claims**

1. A copper free dental gold alloy consisting essentially of 25 to 40% silver, 40 to 60% gold, 5 to 20% palladium, 0.05 to 0.5% iridium, 0 to 6% indium 0 to 6% tin and 0 to 2% zinc, with the proviso that the named non-noble metals are present in a total amount of at least 2%.

4,008,081

METHOD OF MAKING VACUUM INTERRUPTER CONTACT MATERIALS

Richard L. Hundstad, Forest Hills Borough, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 24, 1975, Ser. No. 589,979
Int. Cl.² C22C *1/02*
U.S. Cl. 75—135 **8 Claims**

1. In a method of making contact materials suitable for use in a vacuum interrupter, the steps comprising melting a predetermined mass of a first metal having a high electrical conductivity, adding from about 30% to about 70% of a second metal in solid form to said molten mass, said second metal having:

a. a melting point in excess of the melting point of the first metal, and

b. a solid solubility in the first metal of less than 1 percent by weight at the temperature to which the first metal is heated, the temperature to which the first metal is heated being within the range between the melting point of the first metal and below the melting point of the second metal, intermixing the liquid and solid components to a uniform consistency, casting the component into the desired configuration, and cooling said configuration to room temperature.

4,008,082

METHOD FOR PRODUCING AN ELECTROPHOTOGRAPHIC RECORDING MATERIAL

Hans-Hermann Beschoner, Bad Westernkotten; Hartmut Dulken, Belecke; Gottfried Guder, Belecke, and Karl-Heinz Kassel, Belecke, all of Germany, assignors to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Continuation of Ser. No. 442,319, Feb. 14, 1974, abandoned.
This application Apr. 19, 1976, Ser. No. 678,386
Claims priority, application Germany, Feb. 19, 1973, 2308070
Int. Cl.² G03G *5/04*; C23C *13/02*
U.S. Cl. 96—1.5 **4 Claims**

1. In a method for producing an electrophotographic recording material composed of a layer of a photoconductive substance comprising an arsenic-selenium alloy whose composition approximately corresponds to As_2Se_3 applied to a conductive substrate, the improvement comprising: initially vapor-depositing a first layer of the photoconductive substance to a thickness of about 0.1 to 2.0μ and substantially less than that of the completed layer onto the substrate while maintaining the substrate at a temperature which lies above the glass transformation temperature of the photoconductive substance; and subsequently vapor-depositing a second layer of the substance to a thickness equal to the remainder of the intended complete layer thickness, at least the major part of the second layer being vapor-deposited while maintaining the substrate at a temperature substantially lower than such transformation temperature and at least more than 80° C less than such transformation temperature.

4,008,083

STABILIZATION OF COLOR IMAGES FORMED BY PHOTOMODULATION OF THE CHRISTIANSEN EFFECT

Donald George Pye, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 20, 1976, Ser. No. 650,800
Int. Cl.² G03G *5/04*
U.S. Cl. 96—27 R **15 Claims**

1. In a method of forming a colored image by projection of light through an imaged Christiansen cell so that the light is separated into scattered and unscattered components either of which is focused on a viewing surface, said Christiansen cell having two constituents of different optical dispersion but having identical refractive indices at a matching wave-length in or near the visible spectrum the constituents being a discrete phase dispersed in an optically homogeneous polymerizable medium whose refractive index is locally changed by polymerization, the improvement comprising: forming an optically homogeneous, photopolymerizable medium containing a polymerizable monomer and a cross-linking monomer in an amount sufficient to produce upon exposure to actinic light cross-linked polymer which stabilizes the colored image formed and is optically homogeneous with any remaining medium; and exposing the Christiansen cell to varying intensities of actinic light in accordance with a predetermined image.

7. A christiansen cell having as its operating element a dispersion of a transparent, isotropic solid in a photopolymerizable medium which is an optically homogeneous mixture of: (1) at least one ethylenically unsaturated monomer; (2) at least one cross-linking monomer for said unsaturated monomer in an amount sufficient to produce cross-linked polymer which is optically homogeneous with the medium; and (3) an initiating amount of an actinic light-activatable photoinitiator which does not form gaseous or insoluble products.

4,008,084

METALLIC IMAGE FORMING MATERIAL

Tomoaki Ikeda; Sadaharu Ikeda; Yuzo Mizobuchi, and Takeshi Tomotsu, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Apr. 25, 1975, Ser. No. 571,817

Claims priority, application Japan, Apr. 25, 1974, 49-46949

Int. Cl.² G03C *5/00*

U.S. Cl. 96—35 **12 Claims**

1. A metallic image forming article comprising a support, an intermediate layer comprising aluminum and a metal having a ionization tendency lower than that of aluminum, and an photosensitive resin layer on the intermediate layer.

12. A method of forming a metallic image comprising imagewise exposing the metallic image forming article of claim **1** to active light thereby to form a latent image in accordance with the image-wise exposure, developing said exposed metallic image forming article to remove the easily soluble parts or to strip off the easily peelable parts, thereby dissolving and removing the image part of the underlying aluminum layer or the metal and removing the photosensitive resin layer.

4,008,085

PHOTOSENSITIVE MATERIAL CONTAINING AN ORGANIC POLYHALOGEN COMPOUND AND A DYE PRECURSOR AND THE USE THEREOF

Raymond Gerard Lemahieu, Mortsel, and Urbain Leopold Laridon, Wilrijk, both of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Dec. 18, 1974, Ser. No. 533,890

Claims priority, application United Kingdom, Dec. 19, 1973, 58782/73

Int. Cl.² G03C *5/24, 1/52*

U.S. Cl. 96—48 R **19 Claims**

1. A photographic process wherein a visible image is formed in a recording material, which contains in intimate admixture an image-forming system consisting essentially of:

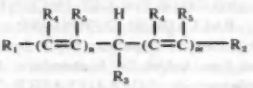
1. at least one ultra-violet radiation-sensitive organic polyhalogen compound corresponding to the following general formula:

wherein:

each of A, B, X and Y are halogen atoms of the group of chlorine, bromine, or iodine, or

wherein one of said groups A, B, X or Y represents an alkyl group, an aryl group or an aroyl group and the other groups chlorine, bromine, or iodine, and

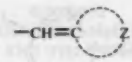
2. a dye precursor compound corresponding to the following general formula:



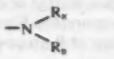
wherein:

R_1 represents (1) a substituted aryl group, at least one substituent of the substituted aryl group being an ether group R_6—O— in which R_6 represents a hydrocarbon group, or (2) a heterocyclic group containing a 5 - membered nitrogen - containing heterocyclic nucleus,

R_2 represents (1) a substituted aryl group, at least one substituent of the substituted aryl group, being an ether group R_6—O—, in which R_6 represents a hydrocarbon group, (2) a heterocyclic group containing a 5 - membered nitrogen - containing heterocyclic nucleus, or (3) a



group in which Z represents the necessary atoms to close a 5-membered nitrogen containing heterocyclic nucleus, R_2 represents (1) a —XH or —X—R_7 group, in which X is oxygen and R_7 is an alkyl group, or (2) a



group wherein each of R_8 and R_9 (same or different) represents hydrogen or an alkyl group, a cycloalkyl group, an aralkyl group, or an aryl group or R_8 and R_9 together represent the necessary atoms to close a 5- or 6-membered nitrogen-containing heterocyclic nucleus,

each of R_4 and R_5 (same or different) represents hydrogen, a C_1—C_5 alkyl group, a cycloalkyl group, an aralkyl group or an aryl group,

n is 0 or 1, and

m is 0,

said visible image being formed (A) by the step of:

information-wise exposing the recording material to activating electromagnetic radiation of a dose sufficient to bring about a directly visible image, or (B) by the steps of:

information-wise exposing the recording material to activating electromagnetic radiation of a dose sufficient to bring about a latent or barely visible image, the image portions of which have a spectral sensitivity in a wavelength range outside the inherent sensitivity range of the ultraviolet radiation-sensitive polyhalogen compound, and overall exposing the image-wise exposed recording material to light within the wavelength range for which the initially exposed portions are made more sensitive than the initially non-exposed portions, thereby bringing about the formation of a visible image corresponding with the initially information-wise exposed portions, or (C) by the steps of:

overall exposing the recording material to electromagnetic radiation of a dose sufficient to bring about in the recording material an increase in spectral sensitivity in a wavelength range outside the inherent sensitivity range of the ultra-violet radiation-sensitive polyhalogen compound, and information-wise exposing the thus overall exposed recording material within the wavelength range for which the overall exposed portions of the recording material are made more sensitive.

4,008,086

SILVER HALIDE EMULSION CONTAINING PHOTOGRAPHIC YELLOW COUPLER

Wataru Fujimatsu; Shui Sato, both of Hachioji; Tamotsu Kojima, Kokubunji; Takaya Endo, Hino, and Kazumi Minahara, Hachioji, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

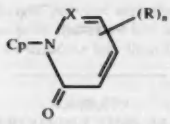
Division of Ser. No. 351,031, April 13, 1973, Pat. No. 3,900,483. This application May 16, 1975, Ser. No. 578,017

Claims priority, application Japan, Apr. 15, 1972, 47-37367; May 27, 1972, 47-52179

Int. Cl.² G03C *7/00, 1/40*

U.S. Cl. 96—56.5 **11 Claims**

1. A light-sensitive gelatinous silver halide photographic emulsion containing a substituted type photographic yellow coupler having the formula,



wherein X is a —N= or —Ch= group; Cp is a .esidue formed by removing one hydrogen atom of the active methylene group of a yellow coupler of the acetanilide type; *n* is an integer of 1 to 4; and R is a hydrogen or halogen atom, or an alkyl, alkoxy, alkycarbonyl, aryl, arylcarbonyl, amino, acylamino, carboxyl, nitrile, aralkyl or aralkyloxy group, provided that in case *n* is 2 or more the R groups may be the same or different and two adjacent R groups in combination may form a benzene ring.

4,008,087

PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

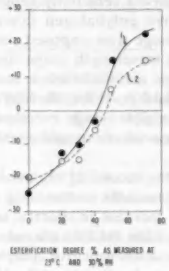
Masazumi Aono; Shuichi Shindo, and Takushi Miyazako, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Aug. 4, 1975, Ser. No. 601,953

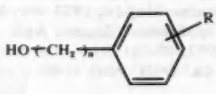
Claims priority, application Japan, Aug. 5, 1974, 49-89606

Int. Cl.² G03C *1/76, 1/84, 1/86, 1/78*

U.S. Cl. 96—69 **7 Claims**



1. A photographic light-sensitive material comprising a support having thereon at least one silver halide photographic layer and at least one layer containing a styrene-maleic acid copolymer having a molecular weight ranging from about 2000 to 500,000, containing 20 to 60 mol % styrene and 40 to 80 mol % maleic acid, and in which about 10 to 70 mol % of the carboxylic acid groups of the styrene-maleic acid copolymer is esterified with a compound represented by the following formula (I)



(I)

wherein R represents a hydrogen atom, an alkyl group having 1 to 4 carbon atoms or a phenyl group, and *n* is 1 or 2.

4,008,088

MOTION PICTURE FILM MATERIALS CONTAINING MAGNETIC RECORDING STRIPES

August Jean Van Paesschen, Antwerp, Belgium, assignor to AGFA-GEVAERT N.V., Mortsel, Belgium

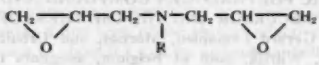
Filed May 20, 1975, Ser. No. 579,220

Claims priority, application United Kingdom, May 24, 1974, 23410/74

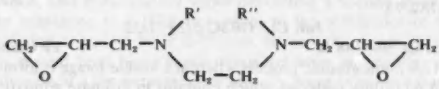
Int. Cl.² G03C *1/84*

U.S. Cl. 96—84 R **11 Claims**

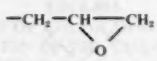
1. A multilayer motion picture film material comprising a support, at least one light-sensitive emulsion layer on one side of such support and, at the opposite side of said support, an antihalation layer capable of being removed from said support in the presence of an alkaline solution, and also comprising, on said antihalation layer, at least one stripe formed by the application thereto of a coating composition containing magnetizable material dispersed in an alkali-insoluble binder, said composition containing a cross-linking agent for the alkali-soluble binder of said antihalation layer, characterized in that as a said cross-linking agent, at least one bis- or polyepoxide is used in combination with at least one sulphoxide and/or formamide, said bis- or polyepoxide corresponding to one of the formulae:



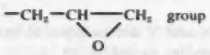
and



wherein R represents an alkyl group of 1 to 6 carbon atoms, a benzyl group, or a group of the formula



and each of R′ and R″ represents a methyl group, or a



group

or R′ and R″ together represent a —CH_2—CH_2— group.

4,008,089

DIRECT-POSITIVE SILVER HALIDE EMULSION REDUCTION AND GOLD FOGGED IN CONTACT WITH A PALLADIUM COMPOUND

Herman Alberik Pattyn, Kapellen; Willy Joseph Vanassche, Kontich, and Luc Achiel De brabandere, Mortsel, all of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Filed Mar. 24, 1975, Ser. No. 561,656

Claims priority, application United Kingdom, Apr. 3, 1974, 14800/74

Int. Cl.² G03C *1/28*

U.S. Cl. 96—108 **9 Claims**

1. A direct-positive silver halide emulsion comprising reduction and gold fogged silver halide grains wherein the grains have an average grain size of less than 100 nm and wherein a palladium compound was added to the silver halide emulsion at the time of fogging said silver halide grains being gold fogged with from about 0.001 to about 0.1 millimole of a gold compound per mole of silver halide.

4,008,090

PROCESS FOR THE PRODUCTION OF TUNGSTEN CARBIDE OR MIXED METAL CARBIDES

Masaya Miyake; Akio Hara, and Noriyuki Ayano, all of Itami, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 287,024, Sept. 7, 1972, abandoned. This application Sept. 2, 1975, Ser. No. 609,729
Claims priority, application Japan, Sept. 7, 1972, 47-69937
Int. Cl.² C04B *35/52*; C01B *31/34*
U.S. Cl. 106—43 4 Claims

4. A process for the production of tungsten carbide containing-mixed metal carbides selected from the group consisting of titanium carbide, tantalum carbide, columbium carbide and mixtures thereof, which consists essentially of mixing tungsten oxide powder-containing high melting point metal oxide powders selected from the group consisting of titanium oxides, tantalum oxides, columbium oxides and mixtures thereof, with carbon power in an amount sufficient to give the theoretical quantity of combined carbon, subjecting the resulting mixture to pelletization, heating the pelletized mixture under movement in a rotary furnace at a temperature of from 1000° to 1600° C in nitrogen to reduce the oxygen content of the oxide to less than 5% and then heating the intermediate product under movement in a rotary furnace at a temperature of from 1600° to 2000° C in a hydrogen atmosphere, the temperature of the second heating being about 200° C higher than that of the first heating.

4,008,091

PROCESS FOR THE PRODUCTION OF FIRING STABLE YELLOW TO RED GLAZE MIXTURES

Hans B. Wagner, Bad Homburg, and Arno Broll, Grundau, both of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Filed Feb. 10, 1976, Ser. No. 656,848
Claims priority, application Germany, Mar. 19, 1975, 2511934
Int. Cl.² C03C *5/00*, *7/00*; C08K *3/10*, *3/30*
U.S. Cl. 106—48 18 Claims

1. In a process for the production of firing stable yellow to red glaze mixture for ceramic products employing a color carrier selected from the group consisting of cadmium sulfide, cadmium selenosulfide, and a mixture of cadmium sulfide and cadmium sulfoselenide comprising providing a composition comprising 60 to 98 parts by weight of a base frit, 2 to 40 parts by weight of a color frit and a suspension agent, said color frit comprising (a) either (1) a cadmium compound and (2) a sulfur source which is sulfur or a sulfur containing compound, or (1) a cadmium compound, (2) a sulfur source which is sulfur or a sulfur containing compound and (3) a selenium source which is selenium or a selenium containing compound, and (b) a base glass comprising a glazed frit the improvement comprising added to said color frit at least one glaze stable compound selected from the group consisting of zirconium oxide, zirconium silicate, tin oxide, ceric oxide, aluminum oxide, titanium oxide, calcium tin silicate, and zinc aluminum oxide in an amount to provide 25 to 95 weight % of the color frit, annealing the color frit at a temperature above 850° C. and subsequently mixing the color frit with the base frit and the suspension agent.

4,008,092

METHOD OF PRODUCING MgO AND Cr_2O_3 BASED REFRACTORIES AND THE PRODUCTS THEREOF

Gunther Lorenz Mortl, Carinthia, Austria, assignor to Osterreichisch-Amerikanische Magnesit Aktiengesellschaft, Austria

Continuation-in-part of Ser. No. 290,767, Sept. 20, 1972, abandoned. This application May 19, 1976, Ser. No. 687,886
Int. Cl.² C04B *35/42*
U.S. Cl. 106—59 5 Claims

1. A sintered refractory brick consisting essentially of about 96 to 99.95 weight percent of a magnesia rich synthetic magnesium chromite sinter containing about 0.05 to 4.0 weight per cent of a member selected from the group consisting of calcium oxide and strontium oxide, said magnesia rich magnesium chromite consisting essentially of about 11 to 61 weight percent free magnesia and about 89 to 39 weight percent magnesium chromite, said magnesia rich magnesium chromite sinter having a total porosity of about 9.5 to 11.9 percent and a particle specific gravity of about 3.6 to 3.8 grams per cubic centimeter.

4,008,093

CONTROL METHOD AND EQUIPMENT FOR CHARGING READY-MIXED CONCRETE ADDITIVES BATCHWISE

Toshiyuki Kitsuda, Morioka; Kenichi Hattori, Musashino; Hiromi Nakagawa, Wakayama; Mitsuru Wakao, Sagamihara, and Tsunehisa Matsuda, Urawa, all of Japan, assignors to Japanese National Railways; Kao Soap Co., Ltd. and Kayabakogyo-Kabushiki-Kaisha, all of Tokyo, Japan

Filed July 8, 1974, Ser. No. 486,348
Claims priority, application Japan, July 12, 1973, 48-77938
Int. Cl.² C04B *7/02*
U.S. Cl. 106—89 4 Claims

1. A control method for the batchwise charging of ready-mixed concrete, comprising the steps of

mixing the concrete until a slump change occurs in the concrete;

detecting the occurrence of the slump change as a function of a change in the mixing torque required for effecting said mixing;

initiating a signal when said change in the mixing torque reaches a predetermined level; and

utilizing said signal to initiate dispensing of slump-adjusting additives into said concrete for a timed period.

4,008,094

HIGH DURABILITY, REINFORCING FIBERS FOR CEMENTITIOUS MATERIALS

George H. Beall, Big Flats, and Hermann L. Rittler, Horseheads, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed July 16, 1975, Ser. No. 596,432
Int. Cl.² C04B *31/06*; C03C *13/00*, *3/04*
U.S. Cl. 106—99 6 Claims

1. Fibers demonstrating exceptional resistance to attack by alkaline solutions composed of a glass consisting essentially, by weight, of 85–99% tholeiitic basalt containing less than about 5% alkali metal oxides and 1–15% ZrO_2.

4,008,095
PAVING COMPOSITIONS AND METHOD FOR PRODUCING THE SAME

Fumiaki Fukushima, Tokyo; Hiroshi Nozaki, Chiba; Keisuke Tanaka, and Takashi Kanagawa, both of Tokyo, all of Japan, assignors to Nichireki Kagaku Kogyo Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 374,543, June 28, 1973, abandoned, which is a continuation of Ser. No. 278,854, Aug. 8, 1972, abandoned, which is a continuation of Ser. No. 18,498, March 11, 1970, abandoned. This application Dec. 9, 1974, Ser. No. 531,181

Claims priority, application Japan, Mar. 12, 1969, 44-18306

Int. Cl.² C08L *7/00, 91/00, 93/00, 95/00*

U.S. Cl. 106—235 **16 Claims**

1. A paving composition, consisting essentially of:

from 3 to 50% by weight of microgranular undigested coal particles having a particle size in the range of 1 to 30μ;

the balance is a bituminous material which is liquid at a temperature below about 200° C. and consisting principally of asphalt, said asphalt being at least about 50% by weight of the total weight of the composition;

said composition being free of mineral aggregate particles, said coal particles being uniformly mixed with and dispersed in the bituminous material, said composition having been prepared by simultaneous trituration of said coal particles and said bituminous material at a temperature below about 200° C. by flowing a mixture of said bituminous material and coal particles between the opposing surfaces of a pair of closely spaced triturating discs, one of which is rotating relative to the other, to subject the mixture to simultaneous compression, shear, friction and centrifugal forces.

14. A method for producing a paving composition, which comprises the steps of

1. feeding into the narrow gap between a pair of opposed, closely spaced triturating discs, one of which is rotating relative to the other at a high speed, a starting mixture free of particles of mineral aggregate and consisting essentially of
   a. from 3 to 50% by weight of undigested coal particles, and
   b. the balance is a liquid bituminous material consisting principally of asphalt, said asphalt being at least about 50% by weight of the total weight of said starting mixture,
2. triturating said starting mixture by subjecting same to simultaneous compression, shear, friction and centrifugal forces between said discs at a temperature below about 200° C. to subdivide the coal particles to a size in the range of 1 to 30μ and simultaneously uniformly mixing and dispersing the coal particles in the liquid bituminous material.

4,008,096
ASPHALT PLUG EMPLACEMENT PROCESS

Randolph H. Knapp, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Division of Ser. No. 497,011, Aug. 13, 1974, Pat. No. 3,901,316. This application Apr. 16, 1975, Ser. No. 568,756

Int. Cl.² C08L *95/00*

U.S. Cl. 106—277 **3 Claims**

1. An oil-in-water emulsion for penetrating into and plugging the pores within the first few inches of a portion of a subterranean earth formation that is encountered by a fluid injected into a well, which emulsion consists essentially of:

an emulsified mixture of an asphalt-containing oil-phase liquid, an aqueous liquid, and a cationic emulsifier, having compositions and concentrations such that (a) the particles dispersed within the aqueous liquid are capable of flowing through the pores of said earth formation, (b) the emulsion has a relatively neutral pH of from about 4 to 8, and (c) the emulsion breaks when its pH is increased by a significant amount; and

dissolved in said aqueous liquid, a pH-increasing reactant having a composition and concentration such that the pH of the emulsion is increased to one at which the emulsion breaks when it is subjected to a time-temperature exposure of from about 5–60 minutes at from about 80°–140° E equivalent to that to which a fluid is exposed when it is injected into said earth formation, said pH-increasing reactant being a member of the group consisting of: mixtures of water-soluble epoxides and water-soluble chlorides, mixtures of water-soluble nitrite salts and water-soluble amides of carbonic acid, and water-soluble cyanate salts.

4,008,097
CO-CONDENSATE MIXTURES OF IMINOISOINDOLINONES

Peter Bitterli, Reinach, and Fritz Kehrer, Basel, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

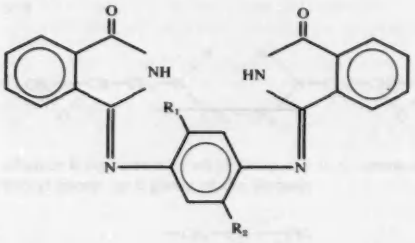
Filed Dec. 3, 1975, Ser. No. 637,361

Claims priority, application Switzerland, Dec. 6, 1974, 16232/74

Int. Cl.² C07D *209/50*

U.S. Cl. 106—288 Q **9 Claims**

1. A pigment, being a co-condensate mixture of two compounds of formula I,



I

wherein

R_1 is chloro, bromo, fluoro, methyl, methoxy or ethoxy, and

R_2 is hydrogen or has one of the significances of R_1,

wherein one of the compounds in said mixture is present in an amount of from 20 to 70 mol % and the other compound in an amount of from 80 to 30 mol %.

4,008,098
PROCESS AND APPARATUS FOR CONTINUOUSLY PRODUCING A HIGH CONCENTRATION SUGAR SOLUTION

Walter Dietzel; Siegfried Matusch; Helmut Schaper, and Erwin Zeichner, all of Braunschweig, Germany, assignors to Braunschweigische Maschinenbauanstalt, Braunschweig, Germany

Filed Dec. 10, 1975, Ser. No. 639,223

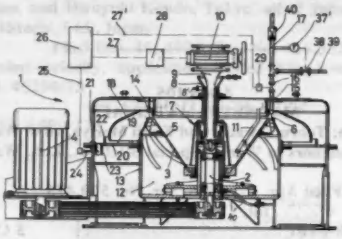
Claims priority, application Germany, Nov. 11, 1974, 2550496

Int. Cl.² B04B *15/00;* **C13F** *1/00*

U.S. Cl. 127—19 **12 Claims**

1. A process for continuously centrifuging massecuite to produce sugar crystals and again dissolving said sugar crystals to produce a sugar solution, comprising continuously introducing massecuite into a centrifuge having a centrifuging basket with an upper rim, to produce sugar crystals, pressurizing a liquid solvent, continuously contacting said sugar crystals with said pressurized liquid solvent by directing jets of said pressurized liquid solvent onto the sugar crystals where these sugar crystals pass over said upper rim of the centrifuging basket to thereby generate a turbulent flow of a liquid solvent

mist and to envelope the sugar crystals with liquid solvent, forcing the enveloped sugar crystals through said liquid turbulent flow of liquid solvent mist against baffle guide means,



guiding said enveloped sugar crystals along said guide means into a back-up zone of sugar solution, and driving the sugar solution together with air and liquid mist through a gap and over a damming wall out of the centrifuge.

4,008,099

CHEMOELECTRIC BATTERY

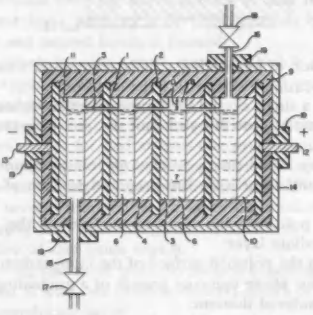
Olle Birger Lindström, Lorensviksv. 14, 183 63 Taby, Sweden

Filed Mar. 11, 1976, Ser. No. 666,013

Claims priority, application Sweden, Mar. 14, 1975, 75028605

Int. Cl.² H01M *1/00*

U.S. Cl. 429—59 **18 Claims**



1. In a chemoelectric battery comprising a plurality of bipolar electrodes; each electrode including an electrically conductive separating wall which is impermeable to electrolyte, negative electrode material disposed on one side of said separating wall, and positive electrode material disposed on the other side of said separating wall, said electrodes being separated by an electrolyte-containing chamber, the improvement wherein each electrolyte chamber includes a gas lock, with the gas locks being fluidly interconnected by means of fluid conduits, said conduits communicating with said gas locks at a level disposed below the top of the electrolyte chamber.

4,008,100

SHEATH FOR TUBULAR STORAGE BATTERY ELECTRODES AND METHOD FOR THEIR PRODUCTION

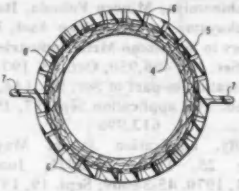
Erik G. Sundberg, Nol, and Erik Westberg, Lidingo, both of Sweden, assignors to Aktiebolaget Tudor, Sundbyberg, Sweden

Division of Ser. No. 533,499, Dec. 17, 1974, Pat. No. 3,972,728. This application Mar. 8, 1976, Ser. No. 664,997

Claims priority, application Sweden, Dec. 17, 1973, 7316973; Aug. 26, 1974, 74107699

Int. Cl.² H01M *4/80*

U.S. Cl. 29—623.4 **7 Claims**



1. A method for producing a sheath for a tubular storage battery electrode which comprises heating a layer of an electro-chemically inert fibrous material, adding thereto a porous foraminous layer of thermoplastic material, whereby the heated fibrous material causes at least local softening of the thermoplastic layer to enable at least surface fibers to become embedded in the softened thermoplastic surface without materially reducing the porosity of the foraminous layer, and forming a tubular sheath from the combined double layer.

4,008,101

METHYLENE CHLORIDE PHOSPHATIZING

Edward A. Rowe, Jr., and William H. Cawley, both of Lake County, Ohio, assignors to Diamond Shamrock Corporation, Cleveland, Ohio

Filed Mar. 20, 1975, Ser. No. 560,378

Int. Cl.² C23F *7/10*

U.S. Cl. 148—6.15 R **46 Claims**

1. A methylene chloride and water-containing liquid composition having a continuous and homogeneous liquid phase suitable for phosphatizing metal with a coating of at least substantial water insolubility, with said liquid phase containing water in minor amount, which composition comprises methylene chloride, solubilizing solvent capable of solubilizing phosphoric acid in methylene chloride, a phosphatizing proportion of phosphoric acid, and water in an amount exceeding said proportion of phosphoric acid, while being sufficient for said composition to provide a phosphatized coating of substantial water insolubility, and while retaining liquid phase homogeneity.

4,008,102

METHOD OF THE MANUFACTURE OF A SUPERCONDUCTOR WITH A LAYER OF THE A-15 PHASE OF THE SYSTEM Nb-Al-Si

Alfred Muller, and Arno Fink, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Oct. 31, 1974, Ser. No. 519,679

Claims priority, application Germany, Nov. 2, 1973, 2355005

Int. Cl.² C23C *1/00*; C21D *1/00*; C22F *1/18*

U.S. Cl. 148—6.11 **7 Claims**

1. In a method for manufacturing a superconductor with a layer of the A-15 phase of the system Nb-Al-Si in which a niobium carrier is placed into an aluminum silicon melt at an elevated temperature and is then subjected to annealing in an inert atmosphere, the improvement comprising coating the niobium carrier with a layer having a thickness of approximately 0.5 to 5μm by steps comprising:

a. preparing a melt having the composition $AL_{95}Si_4Nb_1$;
b. heating said melt to a temperature between 850° and 1300° C;
c. passing said niobium carrier through said melt and thereafter;
d. annealing said carrier with a deposited layer of said melt at a temperature between 1800° and 1950° C for at least 0.5 seconds.

4,008,103

PROCESS FOR THE MANUFACTURE OF STRONG TOUGH STEEL PLATES

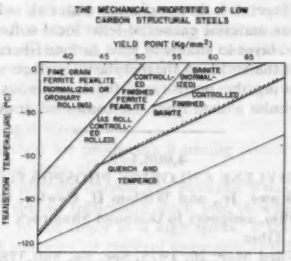
Eiji Miyoshi, Nishinomiya; Minoru Fukuda, Itami; Yasuhiko Hagiwara, Wakayama, and Yasuhiro Asai, Ibaragi, all of Japan, assignors to Sumitomo Metal Industries, Ltd., Japan

Continuation of Ser. No. 408,950, Oct. 23, 1973, abandoned, which is a continuation-in-part of Ser. No. 144,534, May 18, 1971, abandoned. This application Sept. 17, 1975, Ser. No. 613,996

Claims priority, application Japan, May 20, 1970, 45-43563; May 25, 1970, 45-45021; June 11, 1970, 45-50898; July 1, 1970, 45-58009; Sept. 19, 1970, 45-82373; Sept. 19, 1970, 45-82374

Int. Cl.² C21D *7/14*

U.S. Cl. 148—12 F **14 Claims**



1. A method for the manufacture of a high strength and tough steel plate from a steel comprising 0.03 – 0.30% of carbon, not more than 1.5% of silicon, 0.5 – 4.0% of manganese and the balance essentially of iron, the method comprising the steps of; applying a primary rolling step by heating the steel to a temperature higher than 1000° C; rough rolling the heated steel to obtain a steel plate of a suitable intermediate thickness; cooling down the rough rolled steel plate to a temperature lower than 650° C; reheating the cooled steel plate to a temperature of 800° to 1000° C; and applying a secondary rolling step by finish rolling the reheated steel plate within the range of temperature of from 680° to 850° C and with the total reduction in thickness of not less than 30% on the basis of the steel plate thickness when said finishing rolling is started.

4,008,104

METHOD FOR DEPHOSPHORIZATION AND DENITRIFICATION OF AN ALLOY CONTAINING EASILY OXIDIZABLE COMPONENTS

Yasushi Nakamura; Michihisa Itou, both of Tokyo; Takamasa Ohno, Hikari, and Hidetake Ishikawa, Kitakyushu, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed May 5, 1975, Ser. No. 574,696

Claims priority, application Japan, May 9, 1974, 49-50706

Int. Cl.² C21D *1/68*; B23K *35/34*

U.S. Cl. 148—13.1 **6 Claims**

1. A method for removing phosphorus and nitrogen from an alloy containing easily oxidizable components which comprises bringing the alloy in the solid phase thereof into contact with a flux composition comprising
a. at least one member selected from the group consisting of metallic Ca, Mg, Ba and Sr, and
b. at least one member selected from the group consisting of calcium halide, magnesium halide, barium halide and strontium halide
at a temperature not less than the melting point of said flux composition but not more than the melting point of said alloy.

4,008,105

MAGNETIC MATERIALS

Sumio Yuda; Tohru Sawada, and Kohji Moriya, all of Warabi, Japan, assignors to Warabi Special Steel Co., Ltd., Warabi, Japan

Filed Apr. 22, 1975, Ser. No. 570,475

Int. Cl.² H01F *1/02*

U.S. Cl. 148—101 **5 Claims**

1. A ductile permanent magnetic composition exhibiting a residual flux density greater than 10,100 gauss and a coercive force greater than 540 that can be cold drawn from a specimen diameter of 10 mm through a die having a diameter of less than 9.8 mm without breaking and is characterized by small grain structure in the α phase when cooled in water in the order of 20° C. which composition consists essentially of 0.03 to 3.5% by weight of zirconium, 10 to 35% by weight cobalt, 25 to 40% by weight chromium and the balance being iron and incidental impurities.

4,008,106

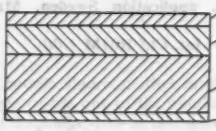
METHOD OF FABRICATING III-V PHOTOCATHODES

William A. Gutierrez; Herbert L. Wilson, both of Woodbridge, and Edward M. Yee, Alexandria, all of Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 13, 1975, Ser. No. 631,589

Int. Cl.² H01L *21/208*, *21/205*

U.S. Cl. 148—172 **1 Claim**

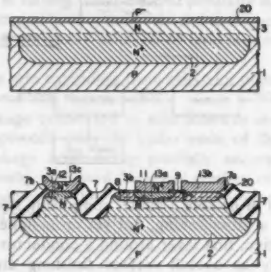


1. A method of fabricating a III–V compound transmission mode photocathode comprising the steps of:
preparing a single crystal III–V compound substrate window for epitaxial growth by chemically polishing the growth surface;
growing by liquid phase epitaxy an intermediate III–III–V compound layer onto the prepared surface of the seed crystal;
optically polishing the exposed surface of the resultant intermediate layer;
protecting the polished surface of the intermediate layer by the vapor phase epitaxial growth of a nucleating layer of III–V material thereon;
removing the nucleating layer by an etchback technique immediately prior to growing by liquid phase epitaxy a III–V photoemitting layer upon the nucleated surface of the intermediate layer;
growing a liquid phase epitaxy III–III–V compound protective layer upon the photoemitting layer during the same growth cycle but at the termination of the growth of the emitting layer;
preferentially chemically removing the III–III–V compound protective layer from the emitting layer; and
activating the surface of the electron emitting layer to a state of negative electron affinity, thereby effecting a functional photocathode.

4,008,107
METHOD OF MANUFACTURING SEMICONDUCTOR DEVICES WITH LOCAL OXIDATION OF SILICON SURFACE

Akio Hayasaka, Kodaira; Hideo Noda, Oume; Michio Suzuki, Hino, and Hiroyuki Kondo, Tokyo, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Dec. 19, 1973, Ser. No. 426,352
Claims priority, application United Kingdom, Sept. 27, 1973, 45236/73
Int. Cl.² H01L 21/76, 27/04
U.S. Cl. 148—175 3 Claims



1. A method for manufacturing a semiconductor device comprising the succeeding steps of:

a. providing a semiconductor substrate of a first conductivity type, said semiconductor substrate having a semiconductor region of a second conductivity type opposite said first conductivity type formed at the surface thereof;

b. forming a first semiconductor layer of said second conductivity type on said semiconductor substrate so as to bury said semiconductor region thereunder;

c. forming a second semiconductor layer of said first conductivity type and having a relatively low impurity concentration over the entire surface of said first semiconductor layer whereby a first PN junction between said first and second layers is formed;

d. selectively forming a mask material which is impermeable to oxygen on at least one predetermined portion of said second semiconductor layer

e. selectively oxidizing said first and second semiconductor layers except for said at least one predetermined portion so that an oxide region having an oxide beak extending between the edge of said mask material and the portion of said second semiconductor layer thereunder is formed, whereby said first PN junction terminates at the side surface of said oxide region;

f. removing said mask material thereby exposing the surface of said at least one predetermined portion of said second semiconductor layer;

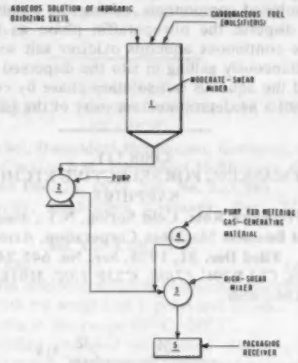
g. diffusing an impurity of said first conductivity type through said at least one predetermined portion into said first and second semiconductor layers while using said oxide region as a mask for the impurity diffusion so as to form a first diffused region of said first conductivity type having a relatively high impurity concentration and defining a second PN junction with said first semiconductor layer, said second PN junction terminating at said first PN junction at a location spaced from the side surface of said oxide region; and

h. providing an electrode in contact with said first diffused region extending over said oxide beak.

4,008,108
FORMATION OF FOAMED EMULSION-TYPE BLASTING AGENTS

Joseph Dean Chrisp, Hagerstown, Md., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 22, 1975, Ser. No. 570,952
Int. Cl.² C06B 45/00, 33/02, 31/30, 43/00
U.S. Cl. 149—2 25 Claims



1. In a method of chemically foaming an emulsion comprised of oxidizing salt, carbonaceous fuel, water and emulsifier to form a blasting agent wherein a gas-generating material is injected into the emulsion and the injected emulsion is subjected to work, said gas-generating material reacting with gas evolution so as to foam said emulsion and thereby decrease the density thereof, the improvement comprising injecting the gas-generating material into a stream of the emulsion, subjecting the injected stream to work only before more than about 50 percent of the total density decrease that is attainable by the full foaming of said emulsion has occurred, and delivering the injected stream into packaging receivers where the remainder of the density decrease takes place, whereby a substantially uniform lowered density is achieved from one receiver to another.

4,008,109
SHAPED HEAT INSULATING ARTICLES

Gerard Norton, Vancouver, Canada, assignor to Chemincon Incorporated, Southfield, Mich.

Filed July 1, 1975, Ser. No. 592,331
Int. Cl.² C06B 33/00; B28B 7/28; C04B 43/00
U.S. Cl. 149—37 12 Claims

1. In a shaped heat insulating article for forming a molten-metal contacting lining for metallurgical moulds or the like which comprises a refractory composite having a high infrared radiation opacity and consisting essentially of an inorganic fibrous refractory material and a granular refractory filler material, an exothermic mixture of a fuel and an oxidising agent, and a binder; the improvement wherein said fibrous refractory material is a material selected from the group consisting essentially of aluminosilicate, zircon and alumina fibres and said shaped article has a density of about 0.25 to 0.55 grams per cubic centimeter.

4,008,110
WATER GEL EXPLOSIVES

Oldrich Machacek, Allentown, Pa., assignor to Atlas Powder Company, Dallas, Tex.

Filed July 7, 1975, Ser. No. 593,307
Int. Cl.² C06B 31/28, 33/08, 31/12, 25/36
U.S. Cl. 149—46 39 Claims

1. A method for producing a surfactant free water gel explosive composition having lasting stability comprising the steps

of combining a liquid nitroparaffin having 1–3 carbon atoms in an amount of 3–30% by weight of the total composition for use as an internal dispersed phase and free of crosslinking agents, an aqueous oxidizer salt solution for use as a continuous external phase, a gelling agent soluble in water for the aqueous oxidizer solution phase, a crosslinking agent for the aqueous oxidizer solution phase, and 0.2–2.0% by weight of the nitroparaffin present of a gelling agent insoluble in water for the liquid nitroparaffin phase, incorporating voids in the above combined components, mixing the combined components to disperse the nitroparaffin phase as fine particles within the continuous aqueous oxidizer salt solution phase, and simultaneously gelling in situ the dispersed nitroparaffin phase and the aqueous salt solution phase by continuing the mixing until a predetermined viscosity of the gel is achieved.

4,008,111

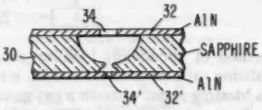
AlN MASKING FOR SELECTIVE ETCHING OF SAPPHIRE

Richard Frederick Rutz, Cold Spring, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 31, 1975, Ser. No. 645,740

Int. Cl.² B29C *17/08*; **C23F** *1/02*; **H01L** *7/50*

U.S. Cl. 156—656 **26 Claims**



1. A method of etching Al_2O_3 including the steps of:

a. depositing an AlN film with a predetermined pattern on said Al_2O_3; and

b. heating said Al_2O_3 in the presence of an Al_2O_3 etchant whereby said Al_2O_3 is etched in said predetermined pattern.

4,008,112

METHOD OF MAKING AN OPTICAL WAVEGUIDE COUPLER

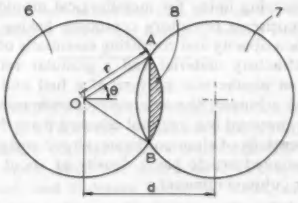
Michael Robert Matthews, London, England, assignor to The Post Office, London, England

Division of Ser. No. 497,095, Aug. 13, 1974, abandoned. This application Aug. 4, 1975, Ser. No. 601,607

Claims priority, application United Kingdom, Aug. 24, 1973, 40221/73

Int. Cl.² C03C *15/00, 25/06*

U.S. Cl. 156—644 **5 Claims**



1. A method of making a dielectric optical waveguide coupler in the form of a hollow tube, with a bore which tapers inwardly from at least one end toward a central capillary sized bore, the steps comprising:

(1). Providing a dielectric tube having a capillary bore extending out of at least one end of said tube, with a liquid filling said bore;

(2). Immersing at least one end of said tube in an etchant for said tube, said etchant being miscible in said liquid.

4,008,113

HIGH VOLTAGE CABLE

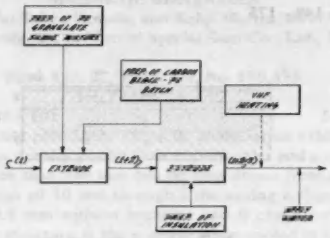
Fritz Glander, Isernhagen, and Hermann Uwe Voigt, Langenhagen, Germany, assignors to Kabel-und Metallwerke Gutehoffaungshutte Aktiengesellschaft, Hannover, Germany

Filed May 20, 1975, Ser. No. 579,193

Claims priority, application Germany, May 11, 1974, 2422914

Int. Cl.² H01B *3/10*

U.S. Cl. 156—52 **5 Claims**



1. Method of making a cable, comprising the steps of:

providing a cross-linking, not yet cross-linked, electrically conductive, first layer around a conductor or conductor assembly as overall surface finishing and conductive coating, the first layer requiring thermal energy for cross-linking;

providing a cross-linking, not yet cross-linked graft-polymeric second layer onto said first layer;

causing said first layer to cross-link through thermal energy conducted from the second to the first layer but without conduction of thermal energy into the second layer from the outside of said first and second layer; and

causing the second layer to cross-link in the presence of moisture.

4,008,114

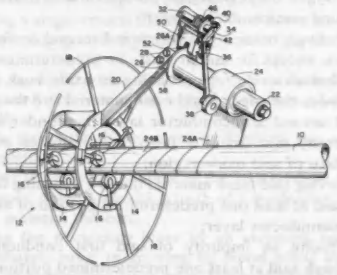
MACHINE FOR WRAPPING TAPE ON A PIPE INCLUDING IMPROVED MEANS OF CONTROLLING THE TENSION ON THE TAPE

Clifford P. Lindsey, Sapulpa, Okla., assignor to Midwestern Manufacturing Company, Tulsa, Okla.

Filed Sept. 15, 1975, Ser. No. 613,337

Int. Cl.² B65H *81/00*

U.S. Cl. 156—392 **3 Claims**



1. A machine for wrapping tape on a pipe including improved means of controlling the tension on the tape, comprising:

a bracket supported for simultaneous rotation around and axial advancement along a pipe;

a spindle rotatably supported to the bracket and adapted for receiving a roll of tape thereon;

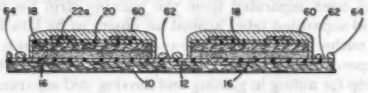
a brake disc coaxially mounted and rotated with said spindle;

a brake housing having a slot therein receiving the outer peripheral area of said disc;
a movable brake pad;
an opening in said brake housing having a said brake pad longitudinally positionable therein, one surface of the brake pad contacting said disc;
a rotatable cam plate having a cam surface thereon, the cam plate being supported in proximity to said brake pad;
a longitudinally positionable cam follower having one end in engagement with said brake pad and the other in engagement with said cam plate, the pressure exerted by said cam follower pushing said brake pad into increased frictional contact with said disc being determined by the rotational position of said cam plate;
a follower arm having the inner end pivotally supported to said bracket and having the outer end in engagement with the external periphery of a roll of tape mounted on said spindle;
a first linkage arm extending from said cam plate normal to the rotational axis thereof; and
a second linkage connected to said follower arm adjacent the inner pivoted end, the outer ends of the first and second linkage arms being pivotally secured to each other, whereby increased frictional contact of said brake pad with said brake disc is achieved in proportion to the diameter of the roll of tape on said spindle.

4,008,115
METHOD FOR MAKING DURABLE OVERCOATED LABELS

Daniel F. Fairbanks, Needham; Frank A. Magnotta, Framingham, and Warren R. Pitts, Winchester, all of Mass., assignors to Dennison Manufacturing Company, Framingham, Mass.

Filed Feb. 25, 1976, Ser. No. 661,401
Int. Cl.² B31B *31/00;* **B29C** *19/02*
U.S. Cl. 156—267 **16 Claims**



14. A method of making a series of laid-on labels each of which has a solvent and abrasion resistant overcoating, the labels being spaced apart on a temporary carrier web from which each label is individually removable, said method comprising as steps

a. applying adhesion-promoting tie coat means to the surface of a laminate comprising a carrier web having a release surface, an adhesive in contact with said release surface, and a label base layer, said tie coat being applied to said base layer and being adapted to improve the adhesion to said base layer of inks and coatings subsequently applied thereto,
b. printing indicia over said tie coat to form a plurality of printed labels,
c. die-cutting through all of said layers except said carrier web in the peripheral outline of said labels, thereby forming a skeleton of surplus material between labels,
d. stripping away said skeleton,
e. moving said carrier web and plurality of labels along a path at a linear speed of at least about 75 feet per minute,
f. forming a continuous film over the surface of said labels and a discontinuous film over the carrier web release surface exposed between labels by applying, in at least two applications, to the carrier web and labels moving along said path a thin layer of liquid curable by exposure to ultra-violet radiation, said liquid containing a photoinitiator sensitive to ultra-violet radiation and wetting agent means for improving the wetting of the surface of said labels by said liquid, said liquid having a viscosity less than about 100 seconds as measured by a No. 2 Zahn cup, said liquid wetting the surface of said labels but not wetting the exposed release surface of said carrier web, the liquid forming over said exposed release surfaces by surface tension beads of liquid substantially unconnected to the continuous films over said labels, and thereafter
g. passing said labels and carrier web in air under a source of ultra-violet radiation sufficient to cure said liquid films over the labels to a solvent and abrasion resistant overcoating layer.

4,008,116
ADHESIVES BASED UPON POLYVINYL ALCOHOL AND STARCH

Hans-Georg Sebel, Dusseldorf-Holthausen, Germany, assignor to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany

Filed Dec. 18, 1974, Ser. No. 533,981
Claims priority, application Germany, Dec. 24, 1973, 2364438
Int. Cl.² C09T *3/02*
U.S. Cl. 156—328 **12 Claims**

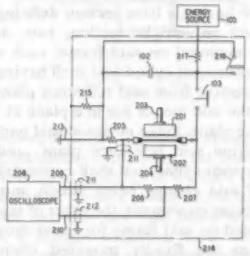
1. An aqueous adhesive solution consisting essentially of:
a. 12% to 25% by weight of a polyvinyl alcohol which is water-soluble in the range 10° C.–30° C.,
b. an unmodified unboiled unoxidized alkali hydrolyzed neutralized starch, the weight ratio of said polyvinyl alcohol to said starch being 65% – 85% : 15% – 35%,
c. 0.1% to 1.0% by weight of an inorganic thickening agent, and
d. water.

9. In a process for adhesively bonding together two substrates wherein an aqueous adhesive solution is applied to at least one of said substrates, said substrates are placed together with said solution therebetween as an intermediate adhesive layer, and said intermediate layer is dried: the improvement wherein the solution of claim 1 is said adhesive layer.

4,008,117
APPARATUS FOR BONDING AND PLATING WITH EXPLODING FOIL

Gay Leon Dybwad, Emmaus, Pa., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Division of Ser. No. 362,191, May 21, 1973, abandoned. This application Feb. 21, 1975, Ser. No. 551,774
Int. Cl.² B23K *11/26;* **C03C** *27/08;* **C23C** *13/08*
U.S. Cl. 156—380 **13 Claims**



1. A system for bonding a pair of workpieces comprising, in combination,

a metal foil,
means for positioning said foil between said workpieces in an area to be bonded,
energy storage means,
means for supplying electrical energy to said energy storage means, and
means for discharging said electrical energy stored in said energy storage means into said foil, whereby said foil is

caused to explode by the current flowing therethrough, thereby bonding said workpieces,

wherein said foil is characterized by at least one slit cut along a surface thereof and in a direction parallel to said current flow.

4,008,118

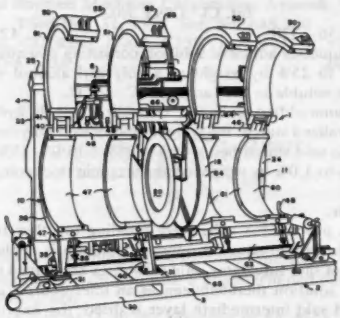
BUTT FUSION MACHINE

Paul E. Wesebaum, Elyria, Ohio, and Wayne E. Cooper, Bartlesville, Okla., assignors to Emerson Electric Co., St. Louis, Mo.

Filed Dec. 30, 1975, Ser. No. 645,436

Int. Cl.² B32B *31/18, 31/20, 35/00*

U.S. Cl. 156—499 **7 Claims**



1. In a butt fusion machine for fusing two sections of large diameter plastic pipe wherein one of said sections is clamped between upper and lower semicylindrical shells hinged for swinging relative to one another to form a clamp which is fixed against linear movement and one of said sections is clamped between upper and lower semi-cylindrical shells hinged for swinging relative to one another to form a clamp which is linearly movable relative to said other clamp, said clamps being axially aligned and spaced from one another, said machine being adapted to accommodate a facer and heater successively between said clamps and between butt ends of the sections of pipe held therein, the improvement comprising an L-shaped frame having a base section defining a base reference plane, and an upright section; two, axially aligned, spaced clamps mounted on said frame, each of said clamps comprising a lower semi-cylindrical shell having a mouth with one part more remote from said reference plane than another part, whereby the said mouth lies in a plane at an acute angle to said reference plane, hinge means at said part of said mouth more remote from said reference plane, and at least one swinging upper semi-cylindrical shell connected to said hinge means, one of said clamps being fixedly mounted on said frame against linear movement, the other of said clamps being movably mounted on said frame for linear movement toward and away from the fixedly mounted clamp; a carriage mounted on the upright section of said frame above the hinge axis of the upper and lower hinge shells for movement parallel to the axis of said clamps; a facer hingedly mounted on said carriage on an axis radially outboard of and substantially parallel to the axis of said clamps for selective swinging between a position intermediate said clamps and a position totally outboard of them; and a heater hingedly mounted on said carriage on an axis radially outboard of and substantially parallel to the axis of said clamps for selective swinging between a position intermediate said clamps and a position totally outboard of them independently of said facer.

4,008,119

LABELLING DEVICE

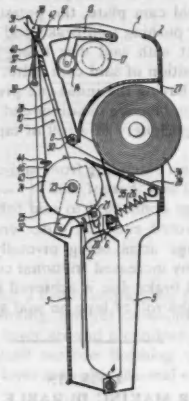
Klaus Dieter Hermann, Klingenstrasse 13, 6932 Hirschhorn, Germany

Filed June 27, 1972, Ser. No. 266,709

Claims priority, application Germany, July 8, 1971, 2134074

Int. Cl.² B65C *11/00*

U.S. Cl. 156—541 **14 Claims**



1. Labelling device comprising:

label supply means for supplying a backing strip with a plurality of adhesive labels attached thereto,

deflecting edge means for separating the labels from the backing strip in response to movement of the backing strip therearound,

a pressure member spaced from the deflecting edge means in the direction of movement of the labels, said pressure member being engageable with a separated label which has been separated from the backing strip for pressing said separated label against an object to be labelled,

and pusher member means engageable with the side of said separated label which was in contact with the backing strip for aiding in guiding and moving said separated label away from the deflecting edge means and into engagement with said pressure member.

4,008,120

PROCESS OF DELIGNIFICATION AND BLEACHING A LIGNOCELLULOSE PRODUCT

Jacques E. Carles, and Louis J. Berge', both of Saint Gaudens, France, assignors to Groupement Europeen De La Cellulose, Paris, France

Filed Dec. 18, 1974, Ser. No. 533,774

Claims priority, application France, Dec. 21, 1973, 73.45930

Int. Cl.² D21C *9/12, 9/14*

U.S. Cl. 162—89 **12 Claims**

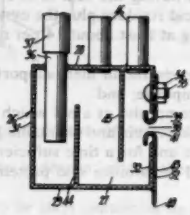
1. A process for the delignification and bleaching of lignocellulose product which comprises mixing an aqueous suspension of the product with a pair of chlorine and oxygen containing compounds which are members selected from the group of pairs consisting of $NaOCl/CO_2$, $Ca(OCl)_2/CO_2$, and Na_2CO_3/Cl_2, said compounds reacting in situ to release a member of the group consisting of chlorine and oxygen and mixtures thereof, which in turn react with the lignocellulose product at a temperature of less than 100° C for less than 60 minutes to delignify and bleach said product.

4,008,121

METHOD OF CURTAIN COATING PIGMENT PARTICLES ON PAPER PLIES

John Douglas Coleman, Surrey Hills, Australia, assignor to Commonwealth Scientific and Industrial Research Organization, Australia

Filed Dec. 4, 1974, Ser. No. 529,584
Claims priority, application Australia, Dec. 10, 1973, 5934/73; Sept. 9, 1974, 8820/74
Int. Cl.² D21H *1/02, 1/22, 1/24*
U.S. Cl. 162—124 5 Claims



1. A method of making multi-ply paperboard, comprising the steps of forming a first ply and building further plies onto the first ply, wherein a suspension of pigment particles in a liquid binder is spread on at least one of the ply surfaces onto which the further plies are formed and before the respective further ply is formed, the suspension being spread on said ply surface by moving said ply surface horizontally in an upwardly facing condition, forcing the suspension through a horizontal slot so that it wets both upper and lower edges of the slot and is extruded generally horizontally from the slot to fall downwardly under gravity across an upright surface of a wall which terminates at a bottom blade edge located above the horizontally moving said ply surface whereby to establish a falling curtain of said suspension over said surface which curtain is thinner than the vertical width of the slot and allowing the established curtain to fall away from said surface at the blade edges and thence onto said ply surface.

4,008,122

PAPER MAKING MACHINE WITH FACING FELT AND FORMING WIRE

Ernst Welte, Ravensburg, Germany, assignor to Escher Wyss G.m.b.H., Ravensburg, Germany

Filed Mar. 26, 1975, Ser. No. 562,058
Claims priority, application Switzerland, Apr. 9, 1974, 4985/74
Int. Cl.² D21F *9/00*
U.S. Cl. 162—290 8 Claims

1. A paper making machine comprising

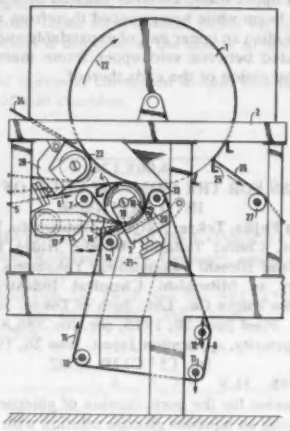
a breast box system having a duct for delivering paper pulp;

a movable wire on one side of said breast box system to receive the pulp;

a felt web on an opposite side of said breast box system in facing relation to said wire to form a paper web of the pulp between said wire and said felt web;

a drying roll; and

a plurality of guide rolls (a) for guiding said felt web and said wire into facing relation with said felt and said wire passing over a part of the circumference of one of said rolls to press said wire against said felt web to form the paper web therebetween and (b) for guiding said felt web and said wire away from each other to permit transfer of the paper web to said drying roll from the felt web, said one of said guide rolls being positioned at a point of separation of the paper web from said wire and being



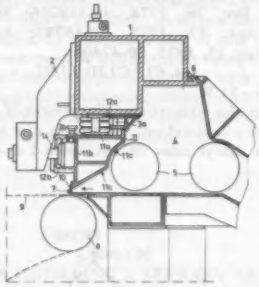
pressed in the direction of said drying roll for pressing said felt web and the paper web against said drying roll.

4,008,123

BEAM-DEFLECTION COMPENSATING STRUCTURE FOR HEADBOXES

Alvi Kirjavainen, Jyvaskyla, Finland, assignor to Valmet Oy, Helsinki, Finland

Filed July 3, 1975, Ser. No. 592,985
Claims priority, application Finland, July 8, 1974, 2096/74
Int. Cl.² D21F *1/02*
U.S. Cl. 162—336 6 Claims



1. In a headbox apparatus of a paper machine, an elongated beam and support means supporting said beam at least at a pair of locations situated inwardly of the ends of the beam and spaced from the center thereof so that due to loading, temperature-differential, and the like said beam tends to become deflected from a straight condition to a curved condition where the beam extends along a curve extending between said locations and beyond the latter to the ends of said beam, and force means engaging said beam at the region of said ends thereof for opposing the tendency of said beam to assume said deflected condition, said support means including a frame means and a connecting means connecting said beam to said frame means to be supported by the latter at said locations, said force means being capable of expansion and contraction and being situated between said frame means and beam at the region of the ends of the latter, said beam and frame means forming part of a front wall structure of the headbox, said beam being situated at a lower part of said front wall structure

and having a lower edge region carrying structure which forms an upper lip of a slice of the headbox, said frame means including an upper frame member situated over and extending along said beam while being spaced therefrom and said force means including an upper pair of expandable and contractable units situated between said upper frame member and said beam at the region of the ends thereof.

4,008,124

PROCESS FOR THE ISOMERIZATION OF GLUCOSE INTO FRUCTOSE

Yoshimasa Fujita, Tokyo; Akiyoshi Matsumoto, Hino; Hachiro Ishikawa, Chofu; Tadashi Hishida; Hideo Kato, both of Tokyo, and Hiroshi Takamisawa, Yokohama, all of Japan, assignors to Mitsubishi Chemical Industries Ltd. and Seikagaku Kogyo Co., Ltd., both of Tokyo, Japan

Filed June 20, 1975, Ser. No. 588,823

Claims priority, application Japan, June 26, 1974, 49-73125

Int. Cl.² C12D *13/02*

U.S. Cl. 195—31 F 12 Claims

1. A process for the isomerization of glucose into fructose by contacting an aqueous glucose solution with glucose isomerase wherein iron ion together with magnesium ion is present in the reaction mixture at concentrations of 0.005 to 5 mm/l and 2 to 20 mm/l, respectively.

4,008,125

NEW CYCLOPENTENE-DIOLS AND NEW ACYL ESTERS THEREOF AND PROCESS FOR THEIR PREPARATION

Seizi Kurozumi; Takeshi Toru; Toshio Tanaka; Shuzi Miura; Makiko Kobayashi; Sadakazu Matsubara, all of Hino, and Sachio Ishimoto, Tokyo, all of Japan, assignors to Teijin Limited, Osaka, Japan

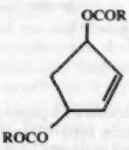
Filed Nov. 10, 1975, Ser. No. 630,711

Claims priority, application Japan, Dec. 26, 1974, 49-148263; Dec. 26, 1974, 49-148266; Mar. 13, 1975, 50-29486; Apr. 17, 1975, 50-45793; Apr. 18, 1975, 50-46525; Apr. 21, 1975, 50-47408

Int. Cl.² C12D *13/02*

U.S. Cl. 195—51 R 10 Claims

1. A process for converting a diacyl ester of cyclopent-1-en-3,5-diol to its monoacyl ester and/or its diol which comprises subjecting a diacyl ester of cyclopent-1-en-3,5-diol of the formula



wherein R is a monovalent hydrocarbon residue of 1–10 carbon atoms, said diacyl ester of cyclopent-1-en-3,5-diol containing at least one member of the group consisting of

1. a diacyl ester of (R)-trans-cyclopent-1-en-3,5-diol,
2. a diacyl ester of (S)-trans-cyclopent-1-en-3,5-diol, and
3. a diacyl ester of cis-cyclopent-1-en-3,5-diol,

to the action of a microorganism or enzyme having a selectivity in its rate of hydrolyzing the acyloxy group of (R) configuration and the acyloxy group of (S) configuration of said diacyl ester, selected from the group consisting of a yeast of the species Saccharomyces, a hydrolytic enzyme contained in the rinds of citrus fruits, a hydrolytic enzyme obtained from the filamentous fungus of the genus Aspergillus, or a hydrolytic enzyme contained in wheat germ.

4,008,126

IMMOBILIZATION OF PROTEINS BY IN-SITU POLYMERIZATION

Melvin H. Keyes, Sylvania, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Mar. 15, 1976, Ser. No. 666,819

Int. Cl.² C07G *7/02*

U.S. Cl. 195—63 18 Claims

1. In the process for immobilizing a protein on a support to form a biological active composite, the improvement comprising the steps of:

selecting a protein having the sum total of one-half of the cystine amino acid residues plus the cysteine amino acid residues equaling at least about 14 per mole of said protein;

depositing said protein on an inert support to form a protein/support composite; and

maintaining said composite at a pH which facilitates polymerization of said protein and maintaining said composite at a temperature and for a time sufficient to polymerize said protein and immobilize said protein in-situ on said support.

4,008,127

PROCESS FOR THE PREPARATION OF CHOLESTEROL OXIDASE

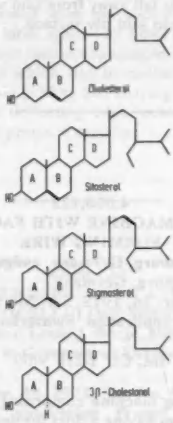
Wolfgang Gruber, Tutzing-Unterzeismering; Hans Ulrich Bergmeyer, Tutzing, Upper Bavaria; Michael Nelboeck-Hochstetter, Tutzing, Upper Bavaria; Klaus Beaucamp, Tutzing, Upper Bavaria; Günter Holz, Aichach; Johanna Gramsall, and Günter Lang, both of Tutzing, Upper Bavaria, all of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim-Waldhof, Germany

Filed Nov. 20, 1975, Ser. No. 633,997

Claims priority, application Germany, Nov. 29, 1974, 2456586

Int. Cl.² C12D *13/10*

U.S. Cl. 195—65 14 Claims

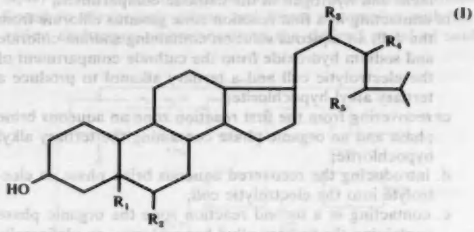


1. Process for the preparation of cholesterol oxidase, capable of catalyzing the oxidation of cholesterol according to the equation

$$\text{cholesterol} + O_2 \rightarrow \text{cholestenone} + H_2O_2,$$

which process comprises culturing *Norcardia erthropolis* ATCC 17895, *Nocardia erthropolis* ATCC 4277, *Nocardia formica* ATCC 14811 or *Proactinomyces erythropolis* NCIB 9158 first on a peptone-containing mineral salt medium and thereafter on at least one sterol compound as the sole source of carbon, and then isolating the cholesterol oxidase formed

from the cultured micro-organisms, wherein said sterol compound is of the formula



(I)

in which

R_1 and R_2 are hydrogen or together represent a double bond,

R_3 and R_4 are hydrogen or together represent a double bond; and

R_5 is hydrogen or alkyl containing up to 3 carbon atoms.

4,008,128

TUBE FURNACE, ESPECIALLY FOR THE CRACKING OF HYDROCARBONS

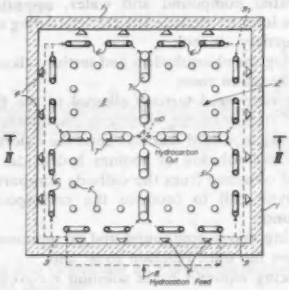
Armin Dorner, Baierbrunn, Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Germany

Filed May 6, 1974, Ser. No. 467,605

Claims priority, application Germany, May 9, 1973, 2323234

Int. Cl.² B01D *1/12;* **C10G** *9/18*

U.S. Cl. 196—110 **3 Claims**



1. In a tube furnace for the thermal cracking of hydrocarbons, said tube furnace comprising:

a rectangular combustion chamber having a plurality of angularly adjoining vertical walls and a floor,

a multiplicity of burners disposed along said walls and on said floor,

a pair of undulating first tubes along each of said walls and at least one undulating second tube of larger flow cross section than each of the respective first tubes in said chamber communicating with the respective pair of first tubes,

said first and second tubes all being formed with vertical conduit stretches interconnected by upper and lower bends,

feed means for feeding hydrocarbons to be cracked to said first tubes, and

outlet means for withdrawiing cracked hydrocarbons from said second tube,

the improvement wherein:

a. each pair of said first tubes lies in a single plane parallel to and inwardly of the respective wall;

b. each of said second tubes lies in a plane perpendicular to the plane of the pair of the respective first tubes and the latter lie to opposite sides of the plane of the respective second tube;

c. said second tubes meet at said outlet means and said outlet means is disposed at the center of said chamber; and

d. said feed means is connected to said first tubes at the corners of said chamber.

4,008,129

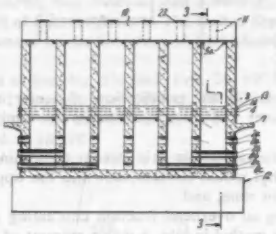
INTERMEDIATE HEAD FOR COKE OVEN BATTERIES

Manfred Strobel, Recklinghausen, Germany, assignor to Firma Carl Still, Germany

Filed Feb. 24, 1975, Ser. No. 552,217

Int. Cl.² C10B *29/04, 45/00*

U.S. Cl. 202—268 **7 Claims**



1. In an intermediate coke oven head comprising spaced-apart substantially parallel steel concrete side walls, cross walls between said side walls dividing the space between said side walls into a plurality of individual compartments, the improvement comprising an aeration and ventilation system connected to said compartments comprising a plurality of air inlets arranged vertically at distinct levels one above the other and extending inwardly from each end of said intermediate head with the lowermost of said air inlets being connected to the innermost of said compartments and with successively higher inlets being connected respectively to the next successively adjacent outer compartment, and at least one air outlet connected to the top of said compartments.

4,008,130

METHOD FOR DISTILLING A TERNARY AZEOTROPE OF FLUOROSILICIC ACID, HYDROGEN FLUORIDE AND WATER

Joel F. M. Leathers, Midland, Mich., and Donald W. Calvin, Zachary, La., assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 23, 1976, Ser. No. 660,294

Int. Cl.² B01D *3/36*

U.S. Cl. 203—6 **5 Claims**

1. A method of distilling an aqueous solution containing H_2SiF_6 while avoiding the formation of unwanted SiO_2 during the distillation, said method comprising

providing in said solution at least about 10 parts by weight of HF and at least about 54 parts by weight of H_2O for each 36 parts by weight of H_2SiF_6,

subjecting the solution to distillation to remove low boiling components, and

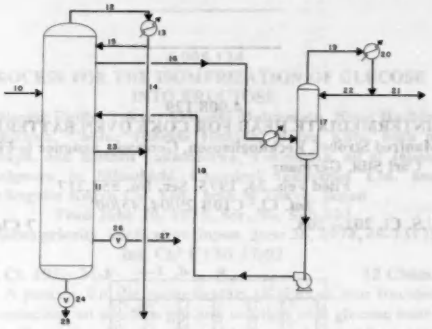
continuing said distillation to separate the ternary azeotrope comprising about 36% H_2SiF_6, about 10% HF, and about 54% H_2O from any higher boiling or non-volatile components.

4,008,131

PURIFICATION OF ACETIC ACID

Jerry L. Price, Texas City, Tex., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 11, 1975, Ser. No. 639,668
Int. Cl.² B01D *3/14*; C07C *51/44*
U.S. Cl. 203—82 **9 Claims**



1. A process for the purification of acetic acid streams containing water and methyl iodide as contaminants which comprises:

a. introducing an acetic acid stream containing water and said methyl iodide contaminant into the upper half of a distillation zone, and

b. removing an overhead fraction containing substantially all of the methyl iodide, a major amount of water and a minor amount of acetic acid charged to said zone, and

c. removing a liquid sidestream containing a minor amount of the water charged to said zone containing some acetic acid but no methyl iodide at a point in the upper one-fourth of said distillation zone, and

d. removing from the lower part of said zone acetic acid which is substantially dry and free of methyl iodide.

4,008,132

PROCESS FOR THE ELECTROLYTE PREPARATION OF DIACETONE-2-KETOGULONIC ACID

Rolf Wittmann, Darmstadt, Germany, assignor to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

Filed Feb. 13, 1976, Ser. No. 658,034
Claims priority, application Germany, Feb. 13, 1975, 2505911
Int. Cl.² C25B *3/02*
U.S. Cl. 204—79 **4 Claims**

1. A process for the preparation of diacetone-2-ketogulonic acid by electrochemical oxidation of diacetone-sorbose in an aqueous alkaline medium, comprising carrying out the electrolysis in the presence of 0.001 to 1% by weight of a surfactant.

4,008,133

PRODUCTION OF EPOXY COMPOUNDS FROM OLEFINIC COMPOUNDS

Abraham P. Gelbein, Plainfield, and Joon Taek Kwon, Freehold Township, both of N.J., assignors to The Lummus Company, Bloomfield, N.J.

Continuation-in-part of Ser. No. 507,786, Sept. 20, 1974, abandoned. This application Mar. 23, 1976, Ser. No. 669,642
Int. Cl.² C25B *3/00*; C07D *301/26*, *303/04*; C07C *31/34*
U.S. Cl. 204—80 **18 Claims**

1. A process for converting an olefinically unsaturated compound to the corresponding epoxy compound, comprising:

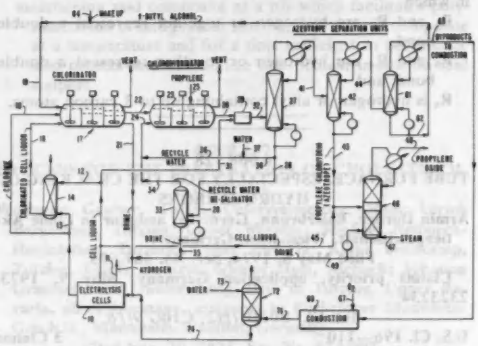
a. producing gaseous chlorine by the electrolysis of an aqueous brine solution in an electrolytic cell including an anode compartment and a cathode compartment, said gaseous chlorine being produced in the anode compartment and hydrogen in the cathode compartment;

b. contacting in a first reaction zone gaseous chlorine from the cell, an aqueous solution containing sodium chloride and sodium hydroxide from the cathode compartment of the electrolytic cell and a tertiary alkanol to produce a tertiary alkyl hypochlorite;

c. recovering from the first reaction zone an aqueous brine phase and an organic phase containing the tertiary alkyl hypochlorite;

d. introducing the recovered aqueous brine phase as electrolyte into the electrolytic cell;

e. contacting in a second reaction zone the organic phase containing the tertiary alkyl hypochlorite, an olefinically



unsaturated compound and water, essentially free of chloride ions, to produce the corresponding chlorohydrin and a tertiary alkanol;

f. recovering the chlorohydrin and tertiary alkanol from the second reaction zone;

g. passing recovered tertiary alkanol to the first reaction zone;

h. contacting in a third reaction zone the chlorohydrin with an aqueous solution of sodium hydroxide and sodium chloride obtained from the cathode compartment of the electrolytic cell to produce the corresponding epoxy compound;

i. recovering epoxy compound and an aqueous brine solution from the third reaction zone; and

j. introducing aqueous brine solution recovered from the third reaction zone into the electrolytic cell as electrolyte.

4,008,134

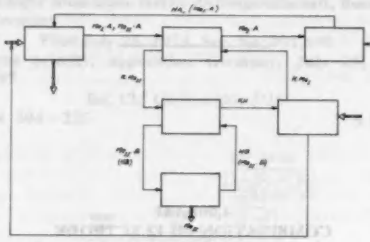
EXTRACTION AND SEPARATION OF METALS FROM SOLIDS USING LIQUID CATION EXCHANGERS

Gunnar Thorsen, Steinhaugen 41, 7000 Trondheim, Norway

Filed May 30, 1974, Ser. No. 474,853
The portion of the term of this patent subsequent to May 25, 1993, has been disclaimed.
Int. Cl.² C25C *1/08*, *1/12*, *1/16*; C01G *3/10*
U.S. Cl. 204—108 **13 Claims**

1. A process for the hydrometallurgic production of at least one desired metal consisting of copper, nickel, cobalt or zinc, from an iron-containing raw material selected from the group consisting of oxide ores, metal oxide waste products and roasted sulphide ores, which comprises leaching solid concentrates of said raw material with an organic liquid phase consisting of a cation exchanger component selected from the group consisting of organic carboxylic acids and alkyl phosphoric acids in solution in an organic solvent, thereby forming a complex between a portion of at least one desired metal and the cation exchanger component, separating the solids containing iron and the remaining desired metal from the organic liquid phase containing said complex, leaching the separated

solids with aqueous sulphuric acid, thereby forming an iron-containing aqueous metal sulphate solution, extracting iron by contacting said sulphate solution with the separated organic liquid phase containing said complex, whereby iron is transferred to the organic phase and forms a complex with the cation exchanger component and the desired metal of said



complex passes from the organic phase to said aqueous sulphate solution, and then recovering desired metals from said aqueous sulphate solution.

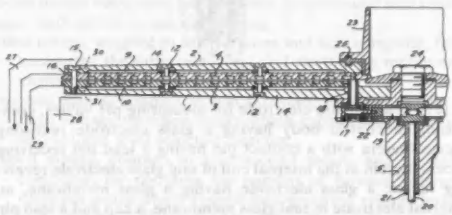
7. A process according to claim 1, wherein the desired metals are recovered from the aqueous sulphate solution, after extraction of iron, in metallic form by electrolysis.

4,008,135

METHOD OF DEIONIZING SOLUTIONS

Hans Otto Ernst Gazda, Anton Kriegerg. 155, A 1238 Vienna, Austria

Filed Feb. 22, 1974, Ser. No. 444,703
Int. Cl.² C02B 1/82
U.S. Cl. 204—149 **2 Claims**



1. A method of deionizing an ion-containing solution which comprises the steps of:

a. providing a narrow annular passage with radially spaced coaxial compartments in a pair of confronting coaxial spaced disks defining said passage betwen them, said disks having opposing walls formed with recess portions constituting said compartments and intermediate portions between said recess portions, the intermediate portions of said walls being mutually spaced by a smaller distance than the confronting recess portions of said walls;

b. applying an electrical potential difference across said passage between said walls whereby one of said walls is electrically positive and the other of said walls is electrically negative;

c. accelerating an ion-containing solution through said passages by rotating said disks to centrifugally displace said solution outwardly while the applied electrical potential causes migration of negatively charged ions to migrate to the positively charged wall and positively charged ions to migrate toward the negatively charged wall as said solution passes through said passage; and

d. continuously channeling the ions which have migrated to the respective walls from the passage through said recesses.

4,008,136

PROCESS FOR THE TREATMENT OF WASTE WATER BY HETEROGENEOUS PHOTOSENSITIZED OXIDATION

John R. Williams, St. Davids, Pa., assignor to Temple University, Philadelphia, Pa.

Filed Aug. 9, 1974, Ser. No. 496,069
Int. Cl.² B01J 1/10; A61L 1/00
U.S. Cl. 204—158 R **9 Claims**

1. A process for treating aqueous waste effluents containing organic materials which comprises adding to said aqueous effluents in the presence of oxygen, a water insoluble polymer-based photosensitizer and then photolyzing the resulting suspension with light having wavelengths between 320 nm. and about 800 nm.

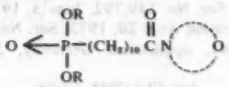
4,008,137

PROCESS FOR THE PREPARATION OF PHOSPHONATED N,N-DISUBSTITUTED FATTY AMIDES

Robert R. Mod, New Orleans; James A. Harris, Pearl River; Jett C. Arthur, Jr., Metairie; Frank C. Magne, Metairie; Mene Sumrell, New Orleans, and Arthur F. Novak, Baton Rough, all of La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 335,860, Feb. 26, 1973, Pat. No. 3,911,120. This application July 10, 1975, Ser. No. 594,895
Int. Cl.² B01J 1/10
U.S. Cl. 204—158 HE **1 Claim**

1. A process for preparing a compound represented by the formula



wherein R is an alkyl radical containing from one to four carbon atoms, which process comprises reacting 10-undecenoylmorpholine with a dialkyl phosphite using gamma-radiation from cobalt-60 to initiate free radical chain reaction.

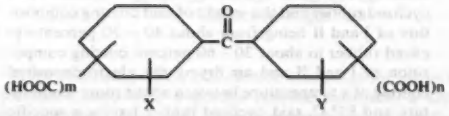
4,008,138

PHOTOPOLYMERIZABLE COMPOUNDS AND COMPOSITIONS COMPRISING THE PRODUCT OF THE REACTION OF A MONOCARBOXY-SUBSTITUTED BENZOPHENONE WITH A RESIN

George Rosen, Wayne; Daniel J. Carlick, Livingston, and Ralph H. Reiter, Wayne, all of N.J., assignors to Sun Chemical Corporation, New York, N.Y.

Division of Ser. No. 405,515, Oct. 11, 1973, Pat. No. 3,926,638, which is a continuation-in-part of Ser. No. 200,174, Nov. 18, 1971, abandoned. This application May 20, 1975, Ser. No. 579,088
Int. Cl.² C08F 8/00; C08G 19/00
U.S. Cl. 204—159.14 **8 Claims**

1. A photopolymerizable compound comprising the product of the reaction of (1) a resin selected from the group consisting of polyamide, polyester, oil-modified polyester, polyether, epoxy, phenolic and polyurethane resins and (2) a monocarboxy-substituted benzophenone having the formula



wherein *m* and *n* is each 0 or 1 and the sum of *m* and *n* is 1; and X and Y is each 1 to 4 halogen atoms or dialkylamino

groups having 1 to 4 carbon atoms; X and Y may be the same or different and either or both may be omitted.

4,008,139

FLUORINATED COMPOUNDS

Joseph H. Johnson; Alvin S. Gordon, both of China Lake, and William P. Norris, Ridgecrest, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 22, 1975, Ser. No. 643,271

Int. Cl.² B01J *1/10*; C07C *31/34*

U.S. Cl. 204—162 R **5 Claims**

1. 1,1,4,4-Tetrakis(trifluoromethyl)butan-1,4-diol.

2. 1,1-Bis(triflioromethyl)propanol-1.

3. A method for preparing tetrakis(trifluoromethyl) butan-1,4-diol and 1,1-bis(trifluoromethyl)propanol-1 comprising the steps of:

A. charging a transparent container with a mixture of gaseous ethane and hexafluoroacetone;

B. exposing the container to sunlight whereby a solid fraction and a liquid fraction are achieved;

C. separating 1,1-bis(trifluoromethyl)propanol-1 from the liquid fraction by distilliation; and

D. separating 1,1,4,4-tetrakis(trifluoromethyl)butan-1,4-diol from the solid fraction by distillation.

4,008,140

ELECTRODEPOSITED COATINGS

Peter Fritsche, Hiltrup, Germany, assignor to Glasurit Werke M. Winkelmann GmbH, Hamburg, Wandsbek, Germany

Continuation of Ser. No. 149,792, June 3, 1971, abandoned. This application Aug. 20, 1973, Ser. No. 389,794

Claims priority, application Germany, June 4, 1970, 2027428

Int. Cl.² C08L *61/06*

U.S. Cl. 204—181 **2 Claims**

1. Coatings on electrically conductive bases produced by connecting said bases as the anode and dipping them into a liquid aqueous coating composition containing:

I. about 10 – 50 percent by weight of a non-heat reactive phenol-aldehyde resin; and

II. about 50 – 90 percent by weight of a copolymer acrylic resin, said copolymer resin containing sufficient water-soluble amine compound to impart anionic polyelectrolyte behavior, said copolymer acrylic resin comprising:

a. about 50 – 85 percent by weight of an ester of acrylic acid or methacrylic acid with an alcohol having 1 – 10 carbon atoms;

b. about 5 – 20 percent by weight of a compound selected from the group consisting of drying oil or drying oil fatty acids containing olefinically unsaturated acids;

c. about 5 – 15 percent by weight of an α,β-olefinically unsaturated carboxylic acid having 3 – 5 carbon atoms; and

d. about 3 – 20 percent by weight of an amide selected from the group consisting of acrylamide, methacrylamide, methylol acrylamide, methylol methacrylamide, an ether of methylol acrylamide with an alcohol having 1 – 8 carbon atoms, an ether of methylol methacrylamide with an alcohol having 1 – 8 carbon atoms and mixtures thereof, the improvement comprising, dispersing additionally in said liquid aqueous coating composition a solution of cyclized rubber, the ratio of weight between cyclized rubber and the weight of said coating composition of I and II being from about 40 – 70 percent cyclized rubber to about 30 – 60 percent coating composition of I and II and air drying the electrodeposited coating at a temperature between about room temperature and 85° C, said cyclized rubber having a specific gravity of about 0.97 – 1.02, a melting point of about 135° – 150° C and a viscosity of about 700 – 1050 seconds as measured in a viscosimeter at 50 percent solution of analytical benzene according to German Industrial Standard 53,211.

4,008,141

COMBINATION PH ELECTRODE

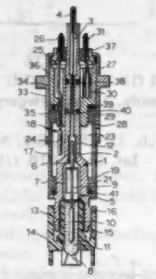
Haruo Kotani, Takatuki; Toshihiko Kunifusa, and Kazunori Sasaki, both of Kyoto, all of Japan, assignors to Horiba, Ltd., Kyoto, Japan

Filed Aug. 29, 1975, Ser. No. 609,150

Claims priority, application Japan, Oct. 4, 1974, 49-114970

Int. Cl.² G01N *27/36*

U.S. Cl. 204—195 G **1 Claim**



1. A combination electrode for measuring pH values, comprising; a central body having a glass electrode receiving recess therein with a contact pin having a lead pin receiving recess therein at the internal end of said glass electrode receiving recess; a glass electrode having a glass membrane, an internal electrode in said glass membrane, a cap and a lead pin thereon with an internal lead extending from said internal electrode to said lead pin, said glass electrode being removably fitted into said glass electrode receiving recess with said lead pin in said lead pin receiving recess, the glass membrane projecting beyond the end of said central body; a protecting cap removably mounted on said central body around said glass electrode and having a lower open end projecting beyond the end of the glass membrane for protecting the glass electrode in the glass electrode receiving recess; a packing around said glass electrode in said glass electrode receiving recess and engaged by said protecting cap for being held in position in said recess; a second body mounted on said central body, a porous side wall removably mounted on said bodies and defining with said bodies an internal solution receiving space, an internal electrode removably mounted in said internal solution receiving space and having a lead and a lead pin extending out of the end of the combination electrode remote from said protecting cap, a thermistor removably mounted in said second body and having leads and lead pins extending out of the end of said combination electrode remote from said protecting cap, a further lead pin connected to said contact pin in said central body also extending out of the end of the combination electrode remote from said protecting cap, and a second protecting cap removably mounted around the outside of said second body.

4,008,142

APPARATUS FOR OPERATING THE FURNACES OF AN ELECTROLYSIS PLANT

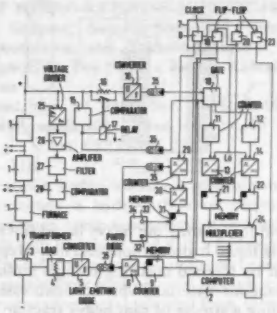
Christfried Doring, Langensendelbach; Johann Thomas, Erlangen; Manfred Volcker, Nurnberg; Volker Sparwald, Grevenbroich, and Walter Habersack, Stade, all of Germany, assignors to Siemens Aktiengesellschaft, Munich and Vereinigte Aluminum-Werke Aktiengesellschaft, Bonn, both of Germany

Filed July 25, 1974, Ser. No. 491,699

Claims priority, application Germany, July 25, 1973, 2337797

Int. Cl.[2] C25C *3/06, 3/16*

U.S. Cl. 204—225 9 Claims



1. In an apparatus for operating an electrolysis plant including a plurality of furnaces, and in which the anode spacing of each of said furnaces is controlled by a computer as a function of furnace resistance, the latter being calculated by said computer from the furnace current and furnace voltage, electronic circuit means interposed between said furnaces and said computer, said circuit means comprising:

first means, coupled to said furnaces and said computer, for measuring the furnace current and storing the measured current values;

second means, coupled to said furnaces, for detecting furnace voltage variation peaks which exceed a first specified voltage level selected therefor;

third means, coupled to said second means and to said computer, for counting the number of furnace voltage variation peaks which exceed said specified voltage level and are detected by said second means, and for generating an output signal when a predetermined number of said peaks are counted; and

fourth means, coupled to said furnaces and said computer, and responsive to said furnace voltage level, for separately detecting, counting and storing furnace voltage measurements which are less than a second specified voltage level and thereby indicate the absence of an incipient anode effect, and which are greater than said second specified voltage level and thereby indicate the occurrence of an incipient anode effect.

4,008,143

ELECTRODE ASSEMBLY FOR AN ELECTROLYTIC CELL

Morton S. Kircher, Oakville, Canada, and Judson A. Wood, Cleveland, Tenn., assignors to Olin Corporation, New Haven, Conn.

Division of Ser. No. 482,295, June 24, 1974, Pat. No. 3,932,261. This application Jan. 6, 1976, Ser. No. 646,816

Int. Cl.[2] C25B *1/26, 9/02, 11/02*

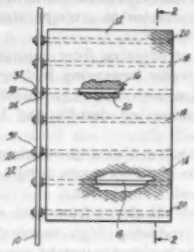
U.S. Cl. 204—257 8 Claims

1. A diaphragm cell for the electrolysis of an aqueous solution of an alkali metal chloride having at least one cathode having a diaphragm thereon, said cathode being attached to a cathode plate positioned vertically and opposite an anode assembly which comprises:

a. an anode plate positioned vertically,

b. two anode surfaces positioned in parallel and having a space between said anode surfaces,

c. at least two conductive supports, one said conductive support attached to each of said electrode surfaces and positioned in said space between said anode surfaces,



d. openings in said anode plate for attachment of said conductive supports, said conductive supports being attached substantially perpendicular to said anode plate, said conductive supports conducting current between said anode plate and said anode surfaces, said conductive supports permitting continuous but restricted flow of said alkali metal chloride solution up through said space between said anode surfaces.

4,008,144

METHOD FOR MANUFACTURING OF ELECTRODE HAVING POROUS CERAMIC SUBSTRATE COATED WITH ELECTRODEPOSITED LEAD DIOXIDE AND THE ELECTRODE MANUFACTURED BY SAID METHOD

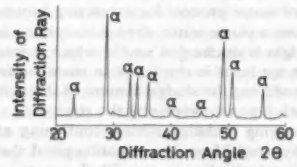
Eiichi Torikai, Yao, and Yoji Kawami, Kawachi-Nagano, Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Filed Aug. 21, 1975, Ser. No. 606,351

Claims priority, application Japan, Aug. 22, 1974, 49-96889

Int. Cl.[2] C25B *1/30, 11/16*

U.S. Cl. 204—290 R 8 Claims



7. An electrodeposited lead dioxide composite for use as an electrode, comprising a porous ceramic substrate, a layer preponderantly of α -lead dioxide deposited on the surface and in the porous surface layer of the substrate, and a layer of $\alpha + \beta$ lead dioxide deposited on said deposited layer of α-lead dioxide.

4,008,145

CONVERTING SOLID FUELS TO GASEOUS AND LIQUID FUELS

Arnold Marcel Leas, 115 S. Line St., Columbia City, Ind. 46725

Filed May 14, 1975, Ser. No. 577,504
Int. Cl.² C10G 1/04
U.S. Cl. 208—8 6 Claims

1. A process for the production of gaseous and liquid fuels from solid fuel sources which comprises:

1. subjecting said solid fuel to oil extraction and hydrogenation in an oil extractor at a temperature of from about 500° to about 900° F;
2. removing top vent gases from said oil extractor to a cobalt oxide treater, removing hydrogen sulfide therefrom by reaction with said cobalt oxide to form cobalt sulfide, and recovering desulfurized low heat content gaseous fuel;
3. reacting the cobalt sulfide with steam and air to produce elemental sulfur and regenerate cobalt sulfide;
4. removing said elemental sulfur;
5. removing solids-oil slurry from said oil extractor to a hydrocracker, reducing high molecular weight compounds to lower molecular weight compounds therein;
6. removing the hydrocracked solids-oil slurry to a solids reactor, admixing said slurry with hot recirculating sand at a temperature of from about 900° to about 1300° F in a downward flow, producing high heat content gaseous fuel and vaporized gasoline and diesel fuels therein;
7. separating said gaseous and vaporized fuels;
8. hydrogenating and recycling said diesel fuel to said oil extractor;
9. recovering said gasoline fuel;
10. recycling a portion of said high heat content fuel gas to the diesel hydrogenator, desulfurizing and recovering the remainder as product;
11. removing ash from said solids reactor;
12. separating solid alkali metals therefrom;
13. decarbonizing said sand in said solids reactor with air, removing carbon dioxide, carbon monoxide and hydrogen therefrom during said decarbonization; and
14. recycling said sand and said carbon dioxide to said solids reactor.

4,008,146

METHOD OF SLUDGE DISPOSAL RELATED TO THE HOT WATER EXTRACTION OF TAR SANDS

Frederick A. Bain, Willowdale, and John O. L. Roberts, Toronto, both of Canada, assignors to Great Canadian Oil Sands Limited, Toronto, Canada

Filed May 27, 1975, Ser. No. 580,853
Int. Cl.² C10G 1/04
U.S. Cl. 208—11 LE 11 Claims

1. In a hot water process for extracting bitumen from tar sands wherein a waste water stream containing at least 20% sand by weight is discharged and in which a retention pond having a sludge layer is employed to store waste water, the method of reducing the sludge content of the material stored in the retention pond comprising the steps of:

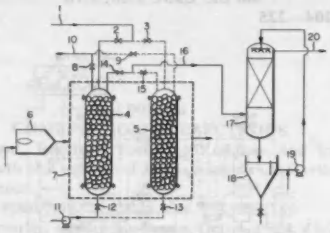
A. withdrawing a sludge stream containing at least 12% solids by weight from the retention pond sludge layer;
B. admixing the sludge stream with the waste water stream;
C. settling the mixture of streams in a settling zone to form a substantially aqueous upper layer and a lower layer comprised of an aqueous/sand/sludge mixture; and
D. dispensing the aqueous/sand/sludge mixture over an inclined sand pile zone to provide additional sand layers thereon having at least a part of the sludge in the mixture entrapped within the interstices of the sand layers.

4,008,147

METHOD FOR TREATMENT OF HEAVY FRACTION RECOVERED THROUGH THERMAL CRACKING OF HIGH MOLECULAR-WEIGHT HYDROCARBONACEOUS MATERIALS

Masaki Kondo, Tokyo, Japan, assignor to Sumitomo Shipbuilding & Machinery Co., Ltd., Tokyo, Japan

Filed Mar. 29, 1974, Ser. No. 456,145
Claims priority, application Japan, Apr. 16, 1973, 48-043521
Int. Cl.² C10G 9/26, 34/00
U.S. Cl. 208—126 5 Claims



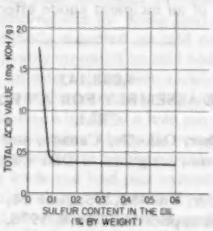
1. A method for treating the heavy liquid fraction comprising evaporable liquid hydrocarbons and non-evaporable materials obtained by thermal cracking of high molecular weight hydrocarbonaceous materials, which consists essentially of the steps of: feeding a stream of said heavy fraction into a vessel packed with a stationary bed of refractory inorganic particles and simultaneously externally heating said bed at an elevated temperature effective to vaporize said evaporable liquid hydrocarbons and to leave said non-evaporable materials deposited on said particles, and removing the vapor of said evaporable hydrocarbons from said vessel; discontinuing the feed of said heavy fraction when said bed contains sufficient deposited non-evaporable materials so as to require regeneration; then feeding molecular oxygen-containing gas into said vessel while continuing to externally heat said bed of refractory inorganic particles at said elevated temperature to incinerate said non-evaporable materials and to regenerate said refractory inorganic particles, and removing the gaseous products of the incineration from said vessel.

4,008,148

METHOD FOR THE PREPARATION OF INSULATING OIL

Midori Masunaga, Tokyo; Yoshiki Kohno, Kawasaki, and Tadashi Ohmori, Yokohama, all of Japan, assignors to Nippon Oil Company Ltd., Tokyo, Japan

Filed Apr. 30, 1975, Ser. No. 573,575
Claims priority, application Japan, Oct. 23, 1974, 49-121521
Int. Cl.² C10G 34/00
U.S. Cl. 208—211 6 Claims



1. Method for the preparation of insulating oil having good oxidation stability, electric characteristics and resistance to

copper corrosion which comprises subjecting a distillate within a temperature having a boiling range from 250° to 400° C. at atmospheric pressure to solvent refining to provide a raffinate oil in which 30 to 75% by weight of the sulfur present in the distillate is removed in said solvent refining step, said distillate having been obtained from a paraffin base crude oil or mixture base crude oil, subjecting said raffinate to hydrogenating refining with hydrogen and a hydrogenation catalyst to reduce from 40 to 90% by weight of the sulfur present in the raffinate and subjecting said hydrogenated oil to solvent dewaxing to provide said insulating oil having a sulfur content from 0.1 to 0.35 percent by weight.

4,008,149

PROCESS OF HYDRO-REFINING HYDROCARBON OILS

Takuji Itoh, Sayama; Satoshi Sakurada, Omiya; Shohei Okano, Tokorazawa, and Takashi Obayashi, Ohi, all of Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 19, 1976, Ser. No. 668,609

Claims priority, application Japan, Apr. 18, 1975, 50-47271

Int. Cl.² C10G *23/02*

U.S. Cl. 208—216 **10 Claims**

1. A process for hydro-refining hydrocarbon oils which comprises contacting a hydrocarbon oil containing sulfur compounds, nitrogen compounds, asphalt and metal-containing compounds with hydrogen and with a hydro-refining catalyst under hydro-refining reaction conditions to remove sulfur, nitrogen and metals from said oil, said catalyst comprising at least one hydrogenation metal selected from Group VI-B and at least one hydrogenation metal selected from Group VIII of the Periodic Table supported on an alumina carrier containing from about 5 to about 25 weight % silica, said catalyst having a specific surface area in the range of from about 250 to about 300 m^2/g and a pore volume distribution characterized in that (1) the volume of pores having a diameter of 60 – 150A is at least about 80% of the volume of pores having a diameter of 0 – 150A, (2) the volume of pores having a diameter of 150–300A is less than about 20% of the volume of pores of 0 – 300A, (3) the volume of pores having a diameter of 0 – 600A is in the range of from about 0.45 to about 0.60 ml/g, as measured by the nitrogen adsorption method, and (4) the volume of pores having a diameter of 150 – 2000A as measured by the mercury porosimetric method, is less than about 0.01 ml/g.

4,008,150

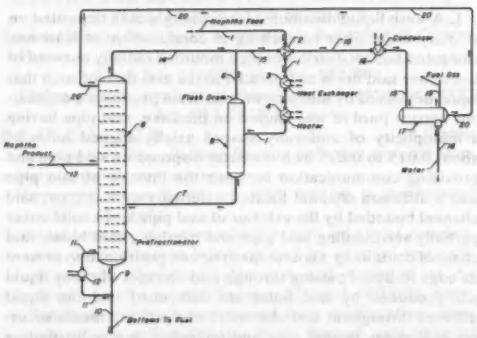
FRACTIONATION TO REMOVE A HIGH-BOILING MATERIAL AND A DISSOLVED SUBSTANCE

Steve A. Gewartowski, Mt. Prospect, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed June 4, 1975, Ser. No. 583,740

Int. Cl.² B01D *3/06*; C01G *7/00*

U.S. Cl. 208—352 **5 Claims**



1. A method for removing a high-boiling material and a volatile dissolved substance chosen from the group consisting of hydrogen, oxygen, methane, ethane, propane, butane, and water from a naphtha feed stream comprising hydrocarbons having boiling points in the range of about 40° C. to about 260° C. which comprises the steps of:

a. passing said feed stream into a flash zone and effecting the vaporization of about 25 to 75 vol. % of said feed stream and the formation of a single flash vapor stream comprising substantially all of the volatile dissolved substances and a single flash liquid stream comprising substantially all of the high-boiling material;

b. passing said single flash liquid stream into a fractionation column at a first intermediate point and effecting the fractional distillation of said single flash liquid stream;

c. removing an overhead vapor stream from said fractionation column, and passing said overhead through a condensation zone and into an overhead receiver to remove at least a portion of the volatile dissolved substances therein and to condense said overhead vapor stream;

d. passing said single flash vapor stream through a condensation zone and into said overhead receiver to remove at least a portion of said volatile dissolved substances before charge to said fractionation zone and to condense said single flash vapor stream to a liquefied flash stream;

e. removing a reflux stream comprising an admixture of said condensed overhead stream and said liquefied flash stream from said overhead receiver and passing said reflux stream into the upper portion of said fractionation column;

f. removing a vapor stream comprising said dissolved substances from said overhead receiver;

g. removing a substantially dissolved volatile and high boiling material free product stream from the fractionation column at a second intermediate point located above the first intermediate point; and,

h. removing a bottoms liquid stream comprising the high-boiling material from the fractionation column.

4,008,151

PROCESS FOR ENRICHMENT, BY FLOTATION, OF PHOSPHATE ORES WITH GANGUES CONTAINING CARBONATES

Smaël Mohammed Smani, Rabat, Morocco, assignor to Office Cherifien des Phosphates, Rabat, Morocco

Filed Oct. 29, 1974, Ser. No. 519,012

Claims priority, application France, Oct. 29, 1973, 73.38413

Int. Cl.² B03B *1/04*

U.S. Cl. 209—9 **8 Claims**

1. The process for enrichment, by flotation, of sedimentary phosphate ores with gangues containing carbonates, comprising:

first subjecting the ore to a treatment modifying the surface physical-chemical properties of the phosphated particles which the ore to be treated contains, with the aid of agents to modify said physical-chemical properties, which agents consist essentially of at least one metal salt having iron or aluminum cations and at least one complexing agent which exerts a chelating action on the phosphated particles previously conditioned by the metal salt, to form a surface complex on said particles;

then, during a second stage, adding a flotation collector of the carbonates, consisting essentially of an anionic surfactant with a hydrocarbon chain containing 8 to 20 carbon atoms, which achieves flotation of the carbonate, the formation of the surface complex on the phosphated particles preventing fixation of the collecting agent on the said particles; and

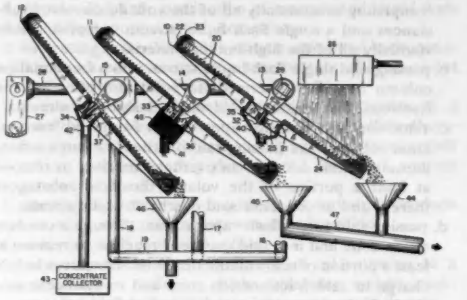
recovering the depressed product, essentially comprised of the sought-after phosphated concentrate.

4,008,152

METAL SEPARATING PROCESS AND APPARATUS

Johnny Hilmer Kleven, 1325 N. Fairview, Burbank, Calif. 91505

Filed Sept. 15, 1975, Ser. No. 613,366
Int. Cl.² B03B 5/74
U.S. Cl. 209—444 **9 Claims**



1. A process of separating metals in the free state from ore which comprises the steps of:

a. applying the ore containing the metal successively to a plurality of downwardly inclined, rotatable, flat pan-shaped separating wheels, said wheels being driven by a common shaft and providing (i) a peripheral retaining lip, (ii) a central annulus, and (iii) a plurality of spiral grooves disposed on the upper surface of each wheel and directed from the wheel periphery to the annulus, each of said wheels being concentrically rotatable about its central annulus;

b. forming a water slurry with the ore on each wheel;

c. washing lighter waste ore out of the grooves and downwardly over the outer retaining lip;

d. forwarding the slurry of beneficiated ore inwardly and upwardly along the spiral grooves to the central annulus and downwardly through a funnel positioned around the annulus;

e. applying the slurry to the next succeeding wheel; and

f. repeating the process until at least three wheel separations have been effected.

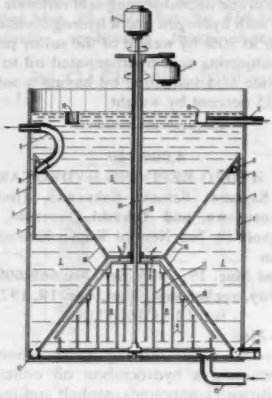
4,008,153

REACTOR FOR PURIFICATION OF WATER BY FLUID FILTRATION

Svatopluk Mackrle, Brno; Vladmir Mackrle, Prague, and Oldrich Dracka, Brno, all of Czechoslovakia, assignors to Agrotechnika, narodny podnik, Zvolen, Czechoslovakia

Filed Apr. 29, 1975, Ser. No. 572,748
Claims priority, application Czechoslovakia, Apr. 29, 1974, 3061/74
Int. Cl.² C02B 3/06
U.S. Cl. 210—208 **7 Claims**

1. In a reactor for the purification, by fluid filtration of water introduced into the reactor via a first inlet conduit, the reactor comprising a vertically oriented tank, first partition means supported in an upper portion of the tank for defining a separating zone, second partition means supported in a lower portion of the tank beneath and in communication with the separating zone and including a pair of upwardly and inwardly extending oblique walls, rotatable impeller means disposed between the oblique walls of the second partition means to define a homogenizing zone, means including an upper apertured wall of the second partition means for effecting communication of liquid in the homogenizing zone with the separating zone, the portion of the tank extending outwardly of the first and second partition means defining a thickening zone, and third partition means extending into the thickening zone from an outer portion of the top of the first partition means, the improvement wherein the first partition means includes a pair of downwardly and inwardly extending oblique walls terminating in contact with the upper end of the upwardly and inwardly extending walls of the second partition



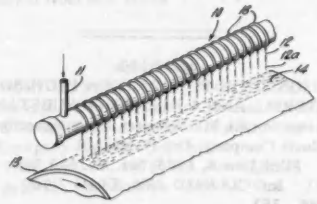
means; wherein the second partition means define a closed chamber isolated from the remaining zones within the tank except through the upper apertured wall; and wherein the reactor further comprises means for connecting the discharge end of the first inlet conduit to the interior of the closed chamber.

4,008,154

ROTARY FILTER WASH DISTRIBUTOR

John F. Richards, Baton Rouge, La., and Robert G. Tripp, Houston, Tex., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation of Ser. No. 456,157, March 29, 1974, abandoned. This application July 11, 1975, Ser. No. 595,236
Int. Cl.² B01D 33/06
U.S. Cl. 210—217 **2 Claims**



1. A wash liquid distributor for washing a cake deposited on a rotary drum filter comprising in combination: at least one elongated hollow distributor pipe mounted radially outward of and above said drum and parallel to the axis thereof such that liquid deposited by said pipe on said drum produces a continuous narrow pool of wash liquid on the cake, said pipe having a multiplicity of uniformly spaced axially aligned holes of about 0.015 to 0.025 inch diameter disposed on said pipe and providing communication between the interior of said pipe and a diffusion channel located externally of said pipe, said channel bounded by the exterior of said pipe and a solid cover partially surrounding said pipe and overlying said holes, said channel containing a coarse mesh screen positioned to present its edge to liquid passing through said channel whereby liquid jets produced by said holes are dampened and the liquid diffused throughout said channel, and overwrap means securing said cover to said pipe and collecting and redistributing said liquid exiting from said channel at a plurality of spaced

drip points along said pipe, whereby a plurality of streams of liquid fall by gravity from said pipe onto said drum without damaging said cake.

4,008,155

APPARATUS FOR DISPOSAL OF EFFLUENTS

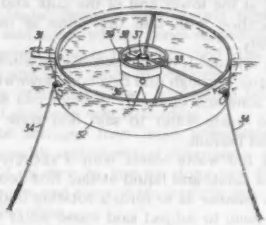
William Gummer Castell, 47 Victoria St., London, England

Continuation of Ser. No. 417,616, Nov. 20, 1973, abandoned. This application Mar. 20, 1975, Ser. No. 560,489

Claims priority, application United Kingdom, Nov. 21, 1972, 53732/72; Oct. 26, 1973, 49961/73

Int. Cl.² E02B *15/04*

U.S. Cl. 210—242 R **2 Claims**



1. Self-contained completely floating waste material treatment apparatus for use at sea without physical support from land, said apparatus comprising means including a first, annular, enclosure, defined by outer and inner concentric vertical walls circular in plan, for the treatment of waste material therein, a second enclosure defined within said inner wall, means including an open-bottom chamber located centrally in said second enclosure and at least one pipe connecting said first enclosure to said chamber for conveying treated effluent from said first enclosure to said chamber, removing substantially all turbulence from said effluent to still the same, and discharging the stilled effluent to said second enclosure, said enclosures and said chamber being structurally interconnected as a unit, flotation means for floatably supporting said unit upon a body of water, means for loosely anchoring said unit to permit the same to rise and fall with the body of water, and means for supplying waste material to be treated to said first enclosure, at least said second enclosure being closed at the bottom thereof for the accummulaton of material which separates from the treated effluent transferred to said chamber, said bottom of said second enclosure comprising a plurality of tapered chambers arranged side-by-side and defined by walls which diverge upwardly, whereby material denser than water is separated from the rest of the waste.

4,008,156

DEVICE FOR SUCKING THE UPPER LAYER OF A POLLUTED WATER SURFACE

Lucien Chastan-Bagnis, 21 Avenue Isola Bella, 06400 Cannes, France

Filed July 3, 1975, Ser. No. 592,904

Claims priority, application France, July 4, 1974, 74.24592

Int. Cl.² E02B *15/04*

U.S. Cl. 210—242 R **3 Claims**

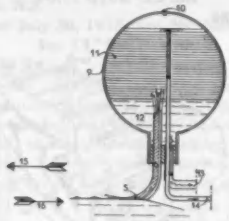
1. Apparatus for collecting floating polluting material from a body of water, comprising:

supporting means having an inlet opening in the forward portion thereof;

channel means in communication with said inlet opening, said channel means being defined by opposed vertically extending sidewalls constructed and arranged to be spaced apart a greater distance adjacent said inlet opening than at a location removed from said inlet opening, whereby as polluted water flows through said channel from said inlet opening toward the portion of said channel at said removed location the level of said polluted water is raised;

a collecting chamber carried on said supporting means, adapted to separate the polluting material from the water according to their specific gravities;

first conduit means connected at one end with said collecting chamber, the other end of said first conduit means having a mouthpiece thereon mounted to extend downwardly into said channel means at said removed location, to contact the raised, polluted upper level of water flowing through said channel at said removed location;



means connected with said collecting chamber operable for creating a negative pressure therein, whereby suction is placed on said first conduit means for drawing said polluted upper level of water into said collecting chamber;

second conduit means in communication at one end thereof with the region of said collecting chamber containing the separated polluting materials, and operable to effect the removal thereof from said chamber; and

third conduit means in communication at one end thereof with the region of said collecting chamber containing the separated water, and operable to effect the removal thereof from said chamber.

4,008,157

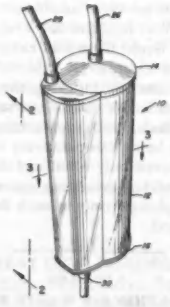
END SEAL CONSTRUCTION FOR SEMIPERMEABLE MEMBRANE

Jimmy L. Miller, Waukegan, and William J. Schnell, Arlington Heights, both of Ill., assignors to Baxter Laboratories, Inc., Deerfield, Ill.

Filed Oct. 8, 1975, Ser. No. 620,546

Int. Cl.² B01D *13/00*

U.S. Cl. 210—321 B **5 Claims**



1. A coil dialyzer for use in an artificial kidney system, which includes an elongated, open-ended tubularly shaped, semipermeable membrane for carrying a fluid to be treated in the dialyzer, and an end sealing system for preventing fluid flow from at least one end of said membrane other than through inlet and outlet conduits, said system comprising: at least one end of said membrane having a flap portion folded so as to define a fold line extending between the longitudinal

edges of said membrane; means defining a membrane receiving groove; and wedge means for engaging said folded membrane and for cooperating with said groove means to maintain said fold line and retain said folded membrane in said groove.

4,008,158

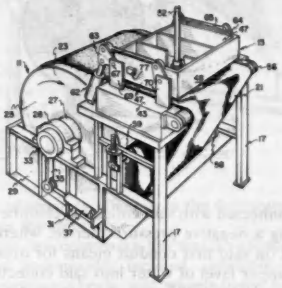
DEWATERING MACHINE

Steven S. Davis, Bountiful, Utah, assignor to Envirotech Corporation, Menlo Park, Calif.

Continuation of Ser. No. 519,893, Oct. 31, 1974, abandoned. This application June 19, 1975, Ser. No. 588,257

Int. Cl.² B01D *33/04*

U.S. Cl. 210—386 **21 Claims**



1. An integral machine for filtering and dewatering solids from a slurry comprising:

a. a rotary drum vacuum filter mounted for at least partial immersion in a tank containing slurry;

b. an endless belt of filter medium trained about the rotary drum of said filter to cover at least the immersed sectors of the drum so that vacuum applied through said filter causes a cake of solids from the slurry to build upon the belt;

c. an expression device inclusive of drainage means supported at a location spaced from said drum and arranged to present a drainage deck over which said endless belt passes, a flexible impervious diaphragm which is supported in face-to-face relationship with said drainage deck and spaced apart therefrom in a relaxed position, and pressurizing means for selectively applying fluid pressure against said diaphragm to urge the same from the relaxed position to a distended position whereat said diaphragm exerts pressure against a cake of solids on a section of said filter medium belt overlying said drainage deck to express liquid from said cake; and

d. indexing means operatively connected to said rotary drum for intermittently indexing the same so that said filter belt carries solids cake from said slurry and onto said drainage deck, said pressurizing means and said indexing means being cooperatively operative such that said drum is indexed only when said diaphragm is relaxed and such that said pressurizing means applies pressure against said diaphragm only at such times as said drum is not being indexed.

4,008,159

RENOVATION OF WASTE WATER

Ferdinand Besik, Mississauga, Canada, assignor to Ontario Research Foundation, Sheridan Park, Canada

Filed Jan. 21, 1975, Ser. No. 542,716

Int. Cl.² C02C *1/04*

U.S. Cl. 210—7 **11 Claims**

1. A process for the renovation of waste water containing a plurality of contaminants including suspended solids, dissolved organic material, nitrogenous material including organic nitrogen-, ammoniacal nitrogen-, nitrite nitrogen- and nitrate nitrogen-containing materials, phosphate material, odor-imparting materials, turbidity-providing materials and bacteria, which comprises:

passing said waste water to a first reaction zone,

removing a part of said suspended solids, dissolved organic materials, nitrogenous material, phosphate material and turbidity-providing materials by subjecting said waste water to a primary treatment in said first reaction zone,

said first reaction zone being constituted by a first single upright tank and said primary treatment comprising:

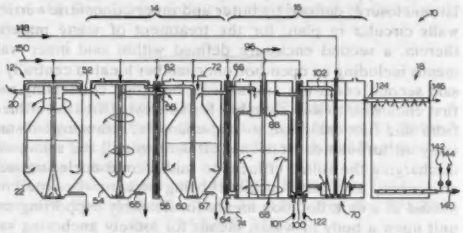
separating said first tank into a first vertically-extending zone extending the height of the tank and a second vertically-extending zone extending through the tank to a location adjacent to and vertically spaced from the lower end of the tank and in fluid flow communication with said first zone at the lower end of the tank and in fluid flow communication with said first zone at the lower end thereof only,

establishing a liquid level in each of said zones and a flow path of liquid through said first tank downwardly through said first zone and upwardly through said second zone,

feeding said waste water to said first zone adjacent the liquid level therein,

mixing said fed waste water with a recycled mixture of suspended solids and liquid at said first zone liquid level in such a manner as to form a rotating body of liquid in said first zone to subject said waste water to centrifugal forces to concentrate suspended solids in the liquid in said first zone,

accumulating said concentrated suspended solids in the bottom of said first tank,



flowing liquor in said flow path from said first zone and into and upwardly through said second zone to separate treated liquid from said accumulated solids for discharge from said primary treatment by withdrawal from said first tank at the downstream end of said flow path treated liquid having a decreased suspended solids- and dissolved organic material-content,

anaerobically decomposing at least a portion of said accumulated solids at the bottom of said first tank,

removing accumulated solids from the accumulation thereof substantially at the rate of mixing of suspended solids and waste water, and

recycling said removed accumulated solids to said first zone as said recycled mixture of suspended solids and liquid,

passing the effluent from said primary treatment from said first reaction zone to a second reaction zone,

removing from said effluent from said primary treatment phosphate material and substantial quantities of suspended solids, dissolved organic material, nitrogenous material and turbidity-providing materials by subjecting said effluent from said primary treatment to an adsorption-biooxidation treatment utilizing activated carbon and microorganisms in said second reaction zone,

removing from said effluent from said adsorption-biooxidation treatment substantial quantities of phosphate material, suspended solids, dissolved organic material, nitrogenous material and turbidity-providing materials and substantially completely said bacteria and odor-imparting material by subjecting said effluent from said adsorption-biooxidation treatment to chemical treatment in said third reaction zone,

said chemical treatment being effected in two separate treatment steps, the first chemical treatment step being carried out in a second single upright reaction tank and comprising:

separating said second reaction tank into a first vertically-extending zone extending upwardly from the bottom of the tank for part of the height thereof, a second vertically-extending zone extending upwardly from the bottom of the tank the height of the first zone and in fluid flow communication with said first zone at the upper end only thereof, and a third vertically-extending zone extending upwardly from the upper extremity of the first and second zones in fluid flow communication with said first and second zones,

establishing a liquid level in said second tank and a flow path of liquid through said second tank downwardly through said third and first zones respectively out of fluid flow communication therewith and upwardly through said first and third zones respectively,

establishing and maintaining a rotating fluidized bed of chemical sludge in said first zone,

mixing said effluent from said adsorption-biooxidation treatment with said chemical coagulant,

feeding said mixture by gravity along said flow path from the upstream end thereof tangentially into the lower end of said first zone,

passing said mixture through said rotating fluidized bed of chemical sludge in said first zone,

chemically coagulating said phosphate materials in said fluidized bed,

passing treated liquid along said flow path through said third zone,

passing chemical sludge from said fluidized bed into said second zone to achieve separation of said treated liquid from chemical sludge,

discharging treated liquid having a decreased phosphate-materials content from said third zone at the downstream end of said flow path, and

accumulating said passed chemical sludge in said second zone,

said second chemical treatment step being carried out in third single upright reaction tank and comprising:

separating said third reaction tank into a first vertically-extending zone extending upwardly from the bottom of the tank extending the height of the tank and a second vertically-extending zone extending the height of the tank in fluid flow communication with said first zone at the lower end thereof only,

establishing a liquid level in each of said zones and a flow path of liquid through said third tank downwardly through said first zone and upwardly through said second zone,

feeding the effluent from the second tank to said first zone at the liquid level therein,

feeding a gaseous mixture of ozone and oxygen into said first zone at the lower end thereof,

allowing said gaseous mixture to rise in said first zone countercurrently to said effluent flowing in said flow path,

absorbing ozone and oxygen from said gaseous mixture in said effluent in said first zone,

passing said effluent having gases absorbed therein from said first zone to said second zone,

oxidizing contaminants in said effluent with said absorbed oxygen and ozone in said second reaction zone,

filtering solids formed in said second zone from the treated liquid adjacent the downstream end of said flow path, and

withdrawing treated liquid having a decreased contaminants content from the downstream end of said flow path, and

recovering renovated waste water substantially free from said contaminants from said third reaction zone,

fluid flow of waste water from one reaction zone to another and within each reaction zone being achieved solely by a combination of gravitational forces and airlift forces whereby said primary treatment, adsorption-biooxidation treatment and chemical treatment are fluidly interconnected for continuous flow of waste water from one treatment to the next.

4,008,160

PROCESS FOR REMOVING OIL FROM OILY WASTE WATER STREAMS

Mohan Vadekar, and Herbert S. Wilson, both of Sarnia, Canada, assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed July 30, 1975, Ser. No. 600,460
Int. Cl.² B01D *13/00*
U.S. Cl. 210—23 R **9 Claims**

1. A process for removing emulsified and free oil from oil-containing aqueous streams, comprising passing said streams over a bed of at least one unprocessed, granular polymeric compound, which compound contains at least 50 mole % of vinyl chloride or its equivalent in carbon-chlorine bonds, thereby removing the oil from the aqueous stream.

4,008,161

TREATMENT OF PULP MILL EFFLUENTS

Alfred Wong, Pointe Claire; Steven Prahacs, Beaconsfield, and Joseph Dorica, Lachine, all of Canada, assignors to Pulp and Paper Research Institute of Canada, Canada

Filed Nov. 29, 1974, Ser. No. 528,478
Claims priority, application Canada, Nov. 28, 1973, 186907
Int. Cl.² C02C *5/02*
U.S. Cl. 210—30 R **19 Claims**

1. A multi-step physical-chemical method for the purification by adsorption, catalytic oxidation and chemical precipitation of kraft pulp mill effluent waste water containing undesirable solid materials in suspended and/or dissolved form, which comprises the following sequential steps:

1. passing an oxygen-containing gas through the waste water at a rate of 0.05 scfh/l–5.0 scfh/l. while the waste water is in intimate contact with a finely divided activated carbonaceous material present in a concentration of 10–8000 mg/l to catalytically oxidize said undesirable materials;
2. adding a clarification agent selected from the group consisting of a coagulant, a flocculant, a polyelectrolyte and mixtures thereof with the provision that when a polyelectrolyte is provided, it is in a concentration of 0.1–20 mg/l and when a coagulant and/or flocculant is provided, it is in a concentration of 10–2000 mg/l, to resultant waste water provided by step (1) to chemically precipitate said undesirable materials; and
3. separating suspended solids in the form of sludge from the waste water by gravitation, flotation or centrifugation.

4,008,162

WASTE TREATMENT OF FLUOROBORATE SOLUTIONS

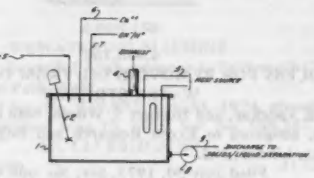
Theodore Frank Korenowski; Jerry Lee Penland, both of Zelienople, and Chalmer John Ritzert, Butler, all of Pa., assignors to Dart Industries Inc., Los Angeles, Calif.

Filed Aug. 5, 1975, Ser. No. 602,180
Int. Cl.² C02B *1/20*
U.S. Cl. 210—45 **10 Claims**

1. A process for removal of fluoride values from a solution containing fluoroborate compounds which comprises:

hydrolyzing said solution at an acid pH of about 4 or less and at an elevated temperature of at least 130° F in the presence of calcium ions to liberate fluoride values,

wherein the total amount of said calcium ions is sufficient to provide at least 0.25 times the potential molar fluoride



value of the solution, and removing said liberated fluoride values from solution.

4,008,163

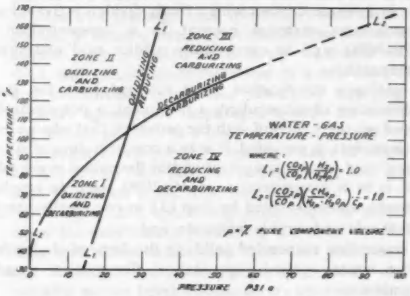
METHOD OF PREPARING A SATURATED FLUID MIXTURE

Glenn R. Ingels, 11607 Windy Lane, Houston, Tex. 77024

Division of Ser. No. 28,192, April 14, 1970, Pat. No. 3,655,172, which is a continuation of Ser. No. 719,613, April 8, 1968, abandoned, which is a continuation-in-part of Ser. No. 604,515, Nov. 28, 1966, abandoned, which is a continuation-in-part of Ser. No. 292,280, July 2, 1963, abandoned. This application Mar. 13, 1972, Ser. No. 234,307

Int. Cl.² C09K *3/00*

U.S. Cl. 252—1 **4 Claims**



1. A method of preparing a saturated fluid mixture suitable for treatment of metallic and non-metallic materials comprising,

saturating liquid water with gases of a gas mixture selected from the group consisting of carbon dioxide and hydrogen, carbon dioxide and methane, and methane and oxygen, in the presence of a carbonaceous material,

while maintaining the liquid water at controlled temperatures of from about 32° F. to about 160° F., and

the gas mixture under controlled pressures from ambient atmospheric up to 218.5 atmospheres,

thereby forming the saturated fluid mixture having properties determined by the controlled temperatures and pressures, and

discharging the formed saturated fluid mixture,

while maintaining its formed properties and characteristics.

4,008,164

PROCESS FOR SCALE INHIBITION

James D. Watson, Houston, and James R. Stanford, Sugar Land, both of Tex., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Mar. 21, 1974, Ser. No. 453,215

Int. Cl.² C02B *5/06*

U.S. Cl. 252—8.55 B **4 Claims**

1. A process for preventing scale deposits from the class consisting of calcium sulfate and calcium carbonate and mixtures thereof from water containing said scale forming chemicals and sodium chloride which consists essentially in adding to said water an effective scale inhibiting amount of a copolymer of acrylic acid and methyl acrylate having a molecular weight within the range of 6,000 to 8,000 and obtained by copolymerizing acrylic acid and methyl acrylate using a molar ratio of acrylic acid to methyl acrylate of 4:1 to 5:1, said copolymer of acrylic acid and methyl acrylate being stable at a pH up to at least pH 10 over a period of at least one hour at temperatures of at least 160° F. against precipitation at 1% by weight dosage in a 5% by weight sodium chloride aqueous brine containing 5000 mg/l of calcium, calculated as calcium carbonate.

4,008,165

SURFACTANT OIL RECOVERY PROCESS USABLE IN HIGH TEMPERATURE FORMATIONS HAVING HIGH CONCENTRATIONS OF POLYVALENT IONS

Jim Maddox, Jr., and Jack F. Tate, both of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Division of Ser. No. 558,404, March 14, 1975, Pat. No. 3,939,911. This application July 7, 1975, Ser. No. 593,394

Int. Cl.² 252 *355;* **E21B** *43/22*

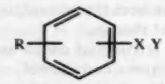
U.S. Cl. 252—8.55 D **6 Claims**

1. An aqueous surfactant-containing fluid for use in flooding subterranean formations which contain petroleum and water having dissolved therein from 200 to 14,000 parts per million divalent ions comprising calcium, magnesium and mixtures thereof, said formation having a temperature from about 125° F to about 225° F, comprising:

a. from about 0.05 to about 5.0 percent by weight of an anionic surfactant with an average molecular weight not to exceed about 360 having one of the following two formulas:

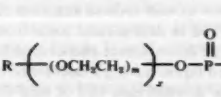
(R–X) Y

wherein R is an alkyl radical, linear or branched, having from 8 to 14 carbon atoms, X is a sulfonate radical, and Y is sodium, potassium or ammonium, or



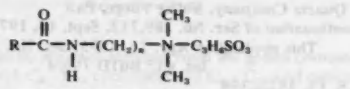
wherein R, X and Y have the same meaning as above;

b. from about .05 to about 5.0 percent by weight of a phosphate ester surfactant with an average molecular weight not to exceed about 1000 having the following formula:



wherein R is alkylphenyl or an alkyl radical having from 12 to 24 carbon atoms, *m* is an integer between 1 and 20, *x* and *y* are 1 or 2 and the sum of *x* and *y* is 3, and R' is hydrogen, sodium, potassium or ammonium;

c. from about 0.05 to about 5.0 percent by weight of a sulfonated betaine having the following structure:



wherein R is an alkyl group having from 12 to 24 carbon atoms and *n* is an integer from 1 to 5 inclusive; and

d. from about 200 to about 1400 parts per million divalent ions selected from the group consisting of calcium, magnesium and mixtures thereof.

4,008,166

OPTICALLY BRIGHTENING WITH A SYNERGISTIC MIXTURE

Christian Luthi, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

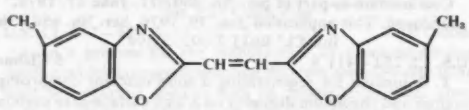
Filed Aug. 16, 1974, Ser. No. 497,970

Claims priority, application Switzerland, Sept. 5, 1973, 12736/73

Int. Cl.² C11D *3/395, 3/42*

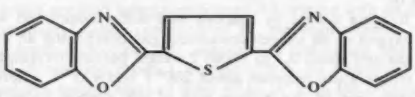
U.S. Cl. 252—89 B **1 Claim**

1. A detergent composition consisting essentially of 0.05 to 0.5% of a fluorescent brightener, which consists of a mixture of 33 to 67% of a compound of the formula



(1)

and 67 to 33% of a compound of the formula



(2)

and the balance of the composition being conventional detergent components.

4,008,167

FOAMING BLEACHING COMPOSITION

Yunosuke Nakagawa, Koshigaya; Masaaki Nishimura, and Koitsu Sato, both of Funabashi, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Mar. 5, 1975, Ser. No. 555,573

Claims priority, application Japan, Mar. 18, 1974, 49-30791

The portion of the term of this patent subsequent to Apr. 27, 1993, has been disclaimed.

Int. Cl.² C11D *7/56*

U.S. Cl. 252—99 **12 Claims**

1. A foamable bleaching composition consisting essentially of from 10 to 100 percent by weight of a mixture of

a. heat treated sodium percarbonate which has been heated at a temperature in the range of 75° to 135° C for a heating time ranging from (1) 2 to 6 hours at 75° C to (2) from 5 to 30 minutes at 135° C, and

b. an activating agent selected from the group consisting of glucose pentaacetate, sorbitol hexaacetate, sodium acetoxybenzene sulfonate, tetraacetyl glycoluril, tetraacetyl ethylenediamine, succinic anhydride and phthalic anhydride, said mixture containing from 5 to 200 weight percent of (b), based on the weight of (a),

and the balance of said composition is one or more water-soluble inorganic builder salts, or an anionic, nonionic or amphoteric household clothes washing surfactant, or a mixture of said salts and said surfactants.

4,008,168

POLYBUTENE COMPOSITION CONTAINING HALOGEN-CONTAINING ADDITIVES AND USE THEREOF

Imre Puskas, Glen Ellyn, and John A. Cengel, Wheaton, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Division of Ser. No. 358,911, May 10, 1973, Pat. No. 3,954,812. This application Nov. 19, 1975, Ser. No. 633,454

Int. Cl.² C07C *7/18;* **C08F** *255/08*

U.S. Cl. 252—182 **9 Claims**

1. An olefin polymer composition comprising the olefin polymer having a $\overline{M}_n$ in the range of about 300 to about 3000 and having 5 to 200 ppm based on the weight thereof of a halogen-containing carboxylic or sulfonic acid, or N-haloamide or N-haloimide of such acid or additive.

4,008,169

PREPARATION OF IRON OXIDE SORBENT FOR SULFUR OXIDES

Patrick John McGauley, 7 Plymouth Road, Port Washington, N.Y. 11050

Division of Ser. No. 403,953, Oct. 5, 1973, abandoned. This application Mar. 7, 1975, Ser. No. 556,347

Int. Cl.² C01B *17/00;* **C09K** *3/00*

U.S. Cl. 252—191 **5 Claims**

1. A process for the preparation of an improved iron oxide sorbent active for use in the purification of sulfur and oxygen-containing gases comprising:

a. providing a quantity of iron sulfate-bearing solids,

b. advancing said solids to a decomposition zone,

c. contacting the solids with hot reducing gas at a temperature of from about 300° to about 700° C. under conditions to produce both a solid that contains magnetite and a product gas that contains both sulfur dioxide and reducing agents,

d. separating the above magnetite-bearing solids from the gas, and

e. oxidizing said magnetite-bearing solids at a temperature below about 450° C. to form an iron oxide-bearing solid sorbent.

4,008,170

DRY WATER

Barry D. Allan, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 28, 1975, Ser. No. 636,328

Int. Cl.² C09K *3/00*

U.S. Cl. 252—194 **2 Claims**

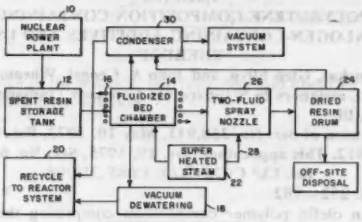
1. The powdered reaction product of liquid water and a submicroscopic particulate silica that is at least 99.9 percent silica and that has a particle size range from about 15–20 mμ, said submicroscopic particulate silica prepared in a hot gaseous environment at about 1100° C by the vapor phase hydrolysis of a silicon compound, said powdered reaction product prepared by adding slowly, while stirring, liquid water in ratio in weight percent of about 1 part water to about 9 parts water to 1 part of said submicroscopic particulate silica to yield said powdered reaction product containing from about 50 weight percent up to about 90 weight percent adsorbed water.

4,008,171

VOLUME REDUCTION OF SPENT RADIOACTIVE ION EXCHANGE RESIN

Erich W. Tiepel, Export; Pang K. Lee, Pittsburgh; Arnold S. Kitzes, Pittsburgh, and Donald L. Grover, McMurray, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 10, 1973, Ser. No. 395,803
Int. Cl.² G21F 9/30
U.S. Cl. 252—301.1 W 5 Claims



1. A process for reducing the volume of spent radioactively contaminated ion exchange material comprising the steps of:

generating a slurry of water and ion exchange material and supplying the slurry to a fluid bed chamber;

removing the free water from said slurry thus leaving wet ion exchange material;

externally heating said chamber and the ion exchange material therein to a temperature between 40° to 150° C;

evacuating said chamber to a pressure between 15 and 29 mercury and then while maintaining said pressure and external heat, introducing superheated steam thereinto at a temperature between about 200°–500° F to remove at least a portion of the intrinsic water in said material to thereby reduce the volume of the material;

conducting the steam and said removed intrinsic water, from said chamber to a condenser; and

discharging the dehydrated ion exchange material to a disposal drum.

4,008,172

AGENT FOR BRIGHTENING AND REMOVING GREYNESS FROM TEXTILES

Richard von Rütte, Riehen, and Walter Gasser, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Oct. 31, 1974, Ser. No. 519,890
Claims priority, application Switzerland, Nov. 29, 1973, 16761/73
Int. Cl.² C09K 11/00; D06L 3/12
U.S. Cl. 252—301.21 10 Claims

1. Agent for the preparation of the baths for brightening the colour of and removing the greyness from white and pastel coloured textiles which are made from synthetic fibres or which are provided with an easy-care finish and are made from cotton or blends thereof with synthetic fibres, which consists essentially of an organic polymer which is soluble or emulsifiable in water and is a homopolymer of acrylic or methacrylic acid or an ester or amide thereof, a copolymer of acrylic or methacrylic acid or an ester or amide thereof with acrylic or methacrylic acid alkylpolyalkylene glycol ester, a polyvinyl alcohol or a polyvinyl acetate, and a mixture thereof and a fluorescent brightener which is of the class of the distyrylbiphenyls, the bis-(s-triazinylamino)-stilbene-2,2′-disulphonic acids or of the bis-(triazolyl)-stilbenes, which at 25° C has a solubility of at least 0.5g/l water.

4,008,173

DEFOAMER COMPOSITION

Stephen A. Davis, Philadelphia, Pa., assignor to Philadelphia Quartz Company, Valley Forge, Pa.

Continuation of Ser. No. 289,712, Sept. 15, 1972, abandoned. This application Apr. 21, 1975, Ser. No. 569,736
Int. Cl.² B01D 19/04
U.S. Cl. 252—358 9 Claims

1. A hydrophobic defoamer base suitable for preparing defoamers for aqueous systems, having a pH of 2 to 5.5 consisting of an amorphous, precipitated hydrophilic metal silicate having a particle size of 10 to 200 mu, the pH of said silicate being adjusted to a value of 1.8 to 5.0 by acid addition and being selected from the group consisting of aluminum silicate (alumino silicate), magnesium silicate, calcium silicate and sodium aluminum silicate (sodium alumino silicate) said hydrophilic metal silicate being rendered hydrophobic by coating with 2 to 30% of an organosiloxane having a viscosity of 10 to 3000 centistokes and heating said coated silicate at a temperature between 230° and 320° C for 4 to 20 hours.

4,008,174

PROCESS FOR REGENERATING A SOLID COPPER-CHROMIUM REACTANT USED IN THE REMOVAL OF HYDROGEN SULFIDE FROM HYDROGEN RECYCLE GAS

Robert L. Jacobson, Pinole, and Kirk R. Gibson, El Cerrito, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 480,071, June 17, 1974, abandoned. This application Jan. 19, 1976, Ser. No. 650,476
Int. Cl.² B01J 23/92, 23/94
U.S. Cl. 252—411 S 5 Claims

1. A process for regenerating a solid reactant comprising copper and chromium disposed on a high-surface-area carbon support, said reactant having reacted to form a solid sulfur compound by contact with a hydrogen sulfide-containing recycle hydrogen stream in a hydrocarbon reforming system for removing substantially all the hydrogen sulfide from said hydrogen stream, said regeneration process comprising the steps of:

a. forming sulfate by reacting said sulfur compound with oxygen in an oxygen-containing gas comprising an inert gas and about 0.1 to about 2 weight percent oxygen at a temperature between about 200° F and 425° F, whereby reduction of the surface area of said carbon support is prevented, and removing the resulting gas from contact with the resulting solid;

b. forming sulfur dioxide by reacting said sulfate with hydrogen at a temperature of about 300° F to about 500° F, whereby a portion of the sulfur dioxide is adsorbed on said resulting solid, and removing the resulting gas from contact with said resulting solid; and

c. desorbing sulfur dioxide from said resulting solid by contacting said solid with an inert gas at a temperature of 450° F to 600° F and removing the resulting gas from contact with said solid.

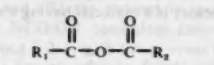
4,008,175

ORGANIC ACID ANHYDRIDE-PEROXYDICARBONATE COMPOSITION

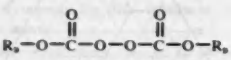
James A. Barter, Akron, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 476,117, June 3, 1974, Pat. No. 3,923,766, which is a continuation-in-part of Ser. No. 284,025, Aug. 28, 1972, abandoned, and Ser. No. 385,787, Aug. 6, 1973, abandoned, which is a continuation-in-part of Ser. No. 284,024, Aug. 28, 1972, abandoned. This application July 9, 1975, Ser. No. 594,411
Int. Cl.² C08F 4/34, 4/38
U.S. Cl. 252—426 7 Claims

1. A composition of matter consisting essentially of organic acid anhydride represented by the general formula,



wherein R_1 and R_2 are each selected from the group consisting of $C_1 - C_{20}$ alkyl, $C_6 - C_{10}$ cycloalkyl and $C_6 - C_{10}$ aryl radicals, and a peroxydicarbonate ester represented by the formula,



wherein R_3 is an aliphatic group of from one to 20 carbon atoms or an aromatic group of from six to eight carbon atoms, the mole ratio of anhydride to peroxydicarbonate ester being from 0.1:1 to 20:1.

4,008,176

PROCESS FOR THE MANUFACTURE OF A CATALYST

Kurt Rust, Frankfurt am Main; Erwin Schrott, Sulzbach, Taunus; Helmut Strametz, Frankfurt am Main, and Hans-Jurgen Kablitz, Liederbach, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Feb. 27, 1975, Ser. No. 553,811

Claims priority, application Germany, Jan. 30, 1975, 2503689

Int. Cl.² C08F *4/64*

U.S. Cl. 252—429 B **10 Claims**

1. In a process for the manufacture of a polymerization catalyst which comprises reacting titanium tetrachloride in an inert hydrocarbon solvent with an aluminum organic compound containing an aluminum dialkyl chloride at a temperature of from −20 to + 20° C in a molar proportion of aluminum dialkyl chloride to $TiCl_4$ of from 0.8 : 1 to 1.5 : 1, separating and washing the reaction product, subsequently thermally treating the $TiCl_3$-containing reaction product suspended in the hydrocarbon solvent in the presence of an ether (said reaction product being component A), mixing with an aluminum dialkyl halide (component B), the improvement which comprises subjecting the suspension containing the solid washed reaction product, component A, to a thermal treatment at a temperature of from 40 to 50° C in the presence of a dialkyl ether in a molar ratio of $TiCl_3$ to ether of from 1 : 0.6 to 1 : 1.2 and also in the presence of a cyclopolyene in a molar ratio of $TiCl_3$ to cyclopolyene of from 1 : 0.001 to 1 : 0.15, and then effecting an after-treatment of component A with an aluminum alkyl halide at a temperature of from 0 to 60° C in a molar ratio of aluminum alkyl halide to $TiCl_3$ of from 0.8 : to 10 : 1.

4,008,177

PROCESS FOR THE MANUFACTURE OF A CATALYST

Kurt Rust, Frankfurt am Main; Erwin Schrott, Sulzbach, Taunus; Helmut Strametz, Frankfurt am Main, and Hans-Jurgen Kablitz, Liederbach, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Feb. 27, 1975, Ser. No. 553,812

Claims priority, application Germany, Jan. 30, 1975, 2503688

Int. Cl.² C08F *4/66*

U.S. Cl. 252—429 B **8 Claims**

1. In a process for the manufacture of a catalyst which comprises reacting titanium tetrachloride in an inert hydrocarbon solvent with an aluminum-organic compound containing an aluminum dialkyl chloride at a temperature of −20° to +20° C. and in a molar proportion of aluminum dialkyl chloride to $TiCl_4$ of 0.8:1 to 1.5:1, separating and washing the reaction product, then thermally treating the $TiCl_3$-containing reaction product suspended in a hydrocarbon solvent in the presence of an ether at a temperature of 40° to 150° C. to form a component A, subjecting component A to an after-treatment with an aluminum alkyl halide and mixing the after-treated component A with an aluminum dialkyl halide (component B), the improvement which comprises carrying out said after-treatment with the aluminum alkyl halide in the presence of an unsaturated compound selected from the group consisting of cyclopolyenes, olefins and mixtures thereof at titanium trichloride/unsaturated compound molar ratios of from 1:0.001 to 1:1 for the cyclopolyenes present and from 1:1 to 1:100 for the olefins present.

4,008,178

ALKYLATION CATALYST FOR PRODUCTION OF MOTOR FUELS

James W. Brockington, Richmond, Va., assignor to Texaco Inc., New York, N.Y.

Division of Ser. No. 520,595, Nov. 4, 1974, Pat. No. 3,922,319. This application Apr. 11, 1975, Ser. No. 567,329

Int. Cl.² B01J *27/00, 27/02*

U.S. Cl. 252—434 **2 Claims**

1. An alkylation catalyst consisting essentially of $HFSO_3$ and H_2SO_4 in a weight ratio of from about 0.11/1 to about 0.32/1 respectively, water in the range of from about 0 to about 3 weight percent, and acid oils in the range of from about 0 to about 10 weight percent, said catalyst having a titratable acidity of from about 16.5 to about 18.5 meq/gm.

4,008,179

CATALYST COMPOSITION

Edward James Gasson, Dollar, Scotland; Thomas Charles Krosnar, deceased, late of Polmont, Scotland, by Alena Krosnar, legal representative, and Stanley Frederic Marrian, Fife, Scotland, assignors to BP Chemicals International Limited, London, England

Filed Oct. 1, 1975, Ser. No. 618,505

Claims priority, application United Kingdom, Oct. 3, 1974, 42915/74

Int. Cl.² B01J *21/06, 23/84, 23/88, 27/18*

U.S. Cl. 252—437 **7 Claims**

1. A catalyst oxide composition suitable for catalysing the reaction of organic compounds which consists essentially of oxygen and the metal elements antimony, tin, copper, iron and titanium, and molybdenum or tungsten, and uranium or vanadium, and which has been heat treated at a temperature between about 700° and 900° C in a molecular oxygen-containing gas either before or after addition of the molybdenum or tungsten.

4,008,180

DEHYDROGENATION METHOD AND MULTIMETALLIC CATALYTIC COMPOSITE FOR USE THEREIN

Richard E. Rausch, Mundelein, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 480,793, June 19, 1974, Pat. No. 3,898,154, which is a continuation-in-part of Ser. No. 376,841, July 5, 1973, Pat. No. 3,846,283, which is a continuation-in-part of Ser. No. 201,576, Nov. 23, 1971, Pat. No. 3,745,112, which is a continuation-in-part of Ser. No. 807,910, March 17, 1969, Pat. No. 3,740,328. This application Apr. 24, 1975, Ser. No. 571,338

The portion of the term of this patent subsequent to Aug. 5, 1992, has been disclaimed.

Int. Cl.² B01J *27/04, 23/58*

U.S. Cl. 252—439 **9 Claims**

1. A catalytic composite comprising a porous carrier material containing, on an elemental basis, about 0.01 to about 2 wt. % platinum or palladium, about 0.01 to about 2 wt. % rhodium, about 0.1 to about 5 wt. % tin, and about 0.01 to about 5 wt. % alkali metal or alkaline earth metal, wherein the platinum or palladium, rhodium, tin, and alkali metal or alka-

line earth metal are uniformly dispersed throughout the porous carrier material, wherein substantially all of the platinum or palladium and rhodium are present in the elemental metallic state, wherein substantially all of the tin and alkali metal or alkaline earth metal are present in an oxidation state above that of the elemental metal and wherein substantially all of the tin is present in a particle size which is less than 100 Angstroms in maximum dimension.

9. A catalytic composite as defined in claim 1 in sulfided form and containing about 0.01 to about 0.5 wt. % sulfur.

4,008,181

STEAM DEALKYLATION CATALYST AND PROCESS FOR PREPARING IT

Tansukhlal G. Dorawala, Wappingers Falls; Russell R. Reinhard, Hopewell Junction, and John H. Estes, Wappingers Falls, all of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Sept. 4, 1975, Ser. No. 610,198

Int. Cl.² B01J *21/04, 23/84, 23/86, 23/88*

U.S. Cl. 252—465 **15 Claims**

1. The process for preparing a catalyst characterized by its ability to catalyze hydrocarbon conversion reactions which comprises

treating a calcined supported catalyst bearing oxides of (i) a Group VIII metal, (ii) a Group VI B metal of chromium, molybdenum or tungsten, and (iii) a Group I A metal in the presence of hydrogen for 4–16 hours at 950°–1400° F thereby forming a treated catalyst; and

recovering said treated catalyst.

4,008,182

LOW DENSITY REFRACTORY INORGANIC OXIDE PARTICLES HAVING HIGH MICROPORE VOLUME

Vladimir Haensel, Hinsdale, and John C. Hayes, Palatine, both of Ohio, assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 429,435, Dec. 28, 1973, abandoned. This application Oct. 28, 1975, Ser. No. 626,516

Int. Cl.² B01J *21/04, 23/62*

U.S. Cl. 252—466 PT **2 Claims**

1. A cogelled composite of alumina and tin comprising 0.1 to 5 wt. % tin, and having deposited thereon from about 0.01 to about 2.0 wt. % platinum group metal, said composite characterized by an average bulk density of from about 0.25 to about 0.4 grams per cubic centimeter, with from about 0.6 to about 0.8 cubic centimeters per gram of the total pore volume being associated with pores having an average diameter of up to about 600 Angstroms.

4,008,183

HIGH TEMPERATURE ANTICORROSIVE MOLDED PRODUCT

Masaji Ishii; Akio Mikogami, and Tetsuo Torigai, all of Machida, Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

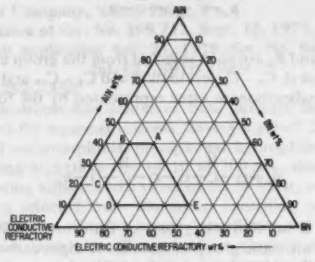
Filed Aug. 14, 1975, Ser. No. 604,839

Claims priority, application Japan, Aug. 15, 1974, 49-93574

Int. Cl.² H01B *1/02*

U.S. Cl. 252—512 **3 Claims**

1. A high temperature, anticorrosive molded product produced by hot pressing a mixture, comprising 1–10 parts by weight of powdered aluminum and 100 parts by weight of a powdered composition of an electrically conductive refractory, boron nitride and aluminum nitride wherein said powdery composition is encompassed by the range electrically conductive refractory: boron nitride: aluminum nitride as shown in the basal triangle of 40:20:40, 50:10:40, 70:10:20, 70:20:10 and 40:50:10 of FIG. 1, and wherein said electrically conductive refractory is a material having a specific resistance



of less than 100$\mu\Omega$-cm at room temperature and a melting point greater than 2300° C.

4,008,184

6,10 DIMETHYL BICYCLO(4,4,0)DECANE OR DECENE ALCOHOL AND ESTER PERFUME COMPOSITIONS

Bruno Maurer, Collonge-Bellerive; Michel G. Fracheboud, and Günther Ohloff, both of Bernex-Geneva, all of Switzerland, assignors to Firmenich S.A., Geneva, Switzerland

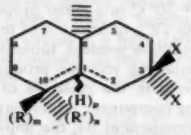
Division of Ser. No. 363,192, May 23, 1973, abandoned. This application Feb. 20, 1976, Ser. No. 659,897

Claims priority, application Luxembourg, June 29, 1972, 65499

Int. Cl.² C11B *9/10*

U.S. Cl. 252—522 **7 Claims**

1. A perfume composition comprising at least one bicyclic compound of formula



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containing a single or a double bond in one of the positions indicated by the dotted lines and wherein the indexes *m*, *n* and *p* represent the integers zero or 1, one of the symbols X represents a hydroxyl or an O-acetyl group and the other represents a hydrogen atom, and wherein the symbol R represents a methyl group when both *n* and *p* are identical and equal to zero and *m* is 1; or one of the symbols R and R' represents a methyl group and the other is a hydrogen atom when both *m* and *n* are identical and equal to 1 and *p* is zero; or one of the symbols R and R' represents a methyl group and the other is a hydrogen atom when all indexes *m*, *n* and *p* are equal to 1 and an inert diluent or a carrier.

4,008,185

PROCESS FOR PREPARING RAPID-SETTING POLYURETHANES

Franciszek Olstowski, Freeport, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Mar. 29, 1974, Ser. No. 456,093

Int. Cl.² C08G *18/18*

U.S. Cl. 260—2.5 AC **5 Claims**

1. A process for preparing polyurethanes which comprises

1. admixing the components of a composition comprising

A. a polyol free from nitrogen groups or mixture of such polyols having from 2 to about 8 hydroxyl groups and an OH equivalent weight of from about 30 to about 200;

B. an organic, aromatic polyisocyanate, and

C. at least a catalytic quantity of a triazine which does not react with or cause a reaction, at room temperature, of

an organic aromatic polyisocyanate; wherein components (A) and (B) are present in quantities so as to provide an NCO:OH equivalent ratio of from about 0.8:1 to about 1.2:1, with the proviso that when Component (A) has an average functionality of about 2, then Component (B) has an average functionality of at least about 2.5;

2. placing the admixed composition into a suitable mold or container wherein said composition solidifies within less than about 15 minutes; and
3. subsequently removing the resultant article from the mold or container.

4,008,186

NOVEL FIRE-RETARDANT POLYMER

Anthony L. Scaggs, Sanford, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Oct. 3, 1975, Ser. No. 619,335

Int. Cl.² C08F *122/40*; **C08J** *9/02*, *9/06*

U.S. Cl. 260—2.5 FP **5 Claims**

1. Poly[N-(3-(1-hydroxyethyl)phenyl)maleimide].

4,008,187

POLYURETHANE FOAMS HAVING REDUCED FLAMMABILITY

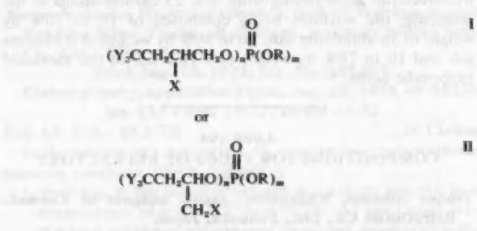
Richard J. Turley, Orange, Conn., assignor to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 334,336, Feb. 21, 1973, Pat. No. 3,883,620. This application Jan. 29, 1975, Ser. No. 545,080

Int. Cl.² C08G *18/14*

U.S. Cl. 260—2.5 AJ **19 Claims**

1. A polyurethane foam prepared from a reaction mixture which comprises a flame retarding proportion of a tetrahalobutyl phosphate ester of the formula:



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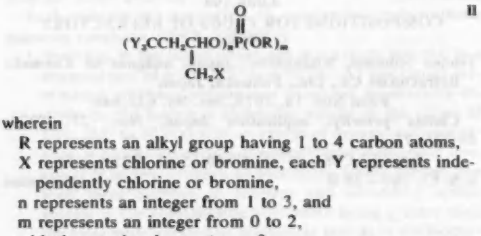


II

wherein

R represents an alkyl group having 1 to 4 carbon atoms,
X represents chlorine or bromine, each Y represents independently chlorine or bromine,
n represents an integer from 1 to 3, and
m represents an integer from 0 to 2,
with the proviso that m + n = 3.

4,008,188

ON-SITE GENERATION OF POLYURETHANE FOAM

Roy P. Alexander, Killingworth, Conn., assignor to Olin Corporation, New Haven, Conn.

Filed Mar. 24, 1975, Ser. No. 561,392

Int. Cl.² C08G *18/14*

U.S. Cl. 260—2.5 AP **16 Claims**

1. In a process for the on-site generation of rigid polyurethane foam, by means of a portable foaming apparatus, wherein a polyether polyol reactant is mixed and reacted with an isocyanate-terminated prepolymer in the presence of a frothing agent, a foaming agent and a reaction catalyst, the improvement of employing as a reactant a prepolymer of (a) a polymethylene polyphenylisocyanate having an average NCO functionality of 2.2–3.5 and (b) a halogenated polyether polyol which is comprised of the product of reacting a polyhydroxy compound with an alkylene oxide having at least one halogen substituent selected from chlorine, bromine or a mixture thereof, said prepolymer having a ratio of NCO:OH groups ranging from about 20:1 to 90:1.

4,008,189

HYDROPHILIC POLYURETHANE FOAM

Bruce G. van Leuwen, Trumbull, and Clifford J. Maxwell, Milford, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 475,694, June 3, 1974, abandoned, which is a continuation-in-part of Ser. No. 382,390, July 25, 1973, abandoned. This application Nov. 4, 1975, Ser. No. 628,727

Int. Cl.² C08G *18/48*, *18/14*

U.S. Cl. 260—2.5 AD **13 Claims**

1. A process for preparing flexible, hydrophilic polyurethane foam from a reaction mixture comprised of an organic polyisocyanate, a foaming agent, a reaction catalyst, and three polyether polyols, namely,

a. a first polyol having a molecular weight of about 3,000—5,000 which is the product of sequentially oxyalkylating an aliphatic triol first with ethylene oxide and then with propylene oxide using a molar ratio, ethylene oxide: propylene oxide, from about 0.3:1 to about 1.6:1, said first polyol being used in a weight proportion from about 10 to about 50 percent of the combined weights of said three polyols,
b. a second polyol having a molecular weight of about 2,000–5,000 which is the product of sequentially oxyalkylating an aliphatic diol first with ethylene oxide and then with propylene oxide using a molar ratio, ethylene oxide:-propylene oxide, from about 0.3:1 to about 1.4:1, said second polyol being used in a weight proportion of about 20–50 percent of the combined weights of said three polyols, and
c. a third polyol having a molecular weight of about 2,400–5,000 which is the product of oxyalkylating an aliphatic triol with a random mixture of ethylene oxide and propylene oxide, the content of ethylene oxide in the mixture being about 5–25% by weight, said third polyol being used in a proportion of about 10–50 percent of the combined weights of said three polyols.

4,008,190

VULCANIZATES OF EPDM AND DIENE RUBBER BLENDS

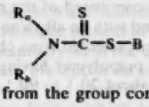
Ray D. Taylor, Brecksville, and Robert A. Krueger, Cuyahoga Falls, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Continuation-in-part of Ser. No. 320,266, Jan. 2, 1973, abandoned. This application Nov. 29, 1974, Ser. No. 528,335

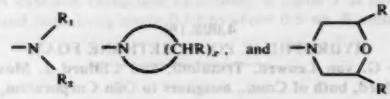
Int. Cl.² C08L *7/00*, *9/00*, *23/16*

U.S. Cl. 260—5 **14 Claims**

1. A vulcanizable composition comprising (1) from about 1% to about 99% by weight of the polymer blend of an ethylene-higher α-olefin-polyene polymer, (2) from about 1% to about 99% by weight of the polymer blend of a highly unsaturated rubber, having an olefinic content from about 20% to about 45% by weight based upon the total weight of the polymer (3) as the vulcanizing agent, sulfur or a sulfur donor used at a level of from about 0.5 to 10 parts by weight based upon 100 parts by weight of the polymer blend, and (4) as the vulcanization accelerator used at a level from about 0.1 to about 10 parts by weight based upon 100 parts by weight of the polymer blend, a thiocarbamylsulfenamide of the formula



where B is selected from the group consisting of



wherein R_1 and R_2 are selected from the group consisting of alkyl radicals containing 1 to about 4 carbon atoms and cycloalkyl radicals containing 4 to 7 carbon atoms in the ring; R is hydrogen or an alkyl radical containing 1 to 2 carbon atoms; x is 4 to 7; and R_a and R_b are alkyl radicals containing 6 to about 30 carbon atoms.

4,008,191

POLYMER ALLOY MEMBRANES CONSISTING OF INHERENTLY ENTANGLED BLENDS OF POLYMERIC PHOSPHONATE AND SECOND POLYMER COMPONENT CONTAINING ESTER GROUPS OR POLYSTYRENE

Joseph Jagur-Grodzinski; David Vofsi, both of Rehovot, and Israel Cabasso, Jerusalem, all of Israel, assignors to Yeda Research and Development Co., Ltd., Rehovot, Israel

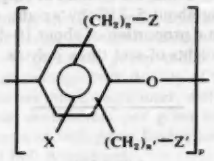
Continuation of Ser. No. 358,061, May 7, 1973, abandoned. This application Apr. 17, 1975, Ser. No. 569,055

Claims priority, application Israel, May 12, 1972, 39426

Int. Cl.² B01D *13/00*; C08L *1/10*

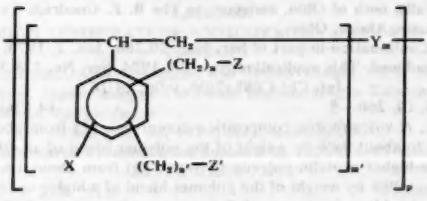
U.S. Cl. 260—17 R **9 Claims**

1. A highly permeable membrane containing a dense selective "skin" and a porous support suitable for solvent separation in a pervaporative cell, said membrane having enhanced permeability while retaining its selectivity, comprising an inherently entangled polymer alloy composition of between 20 and 60 percent of a first phosphorus and halogen-containing polymer component having the formula:



(I)

or



(II)

wherein

m and n are zero or any integer and m' and n' are integers,

p is an integer higher than 10,

X is hydrogen, halogen or a phosphorus-containing group,

Y is CH_2CHCl or CH_2CCl_2, and

Z and Z' are hydrogen or a phosphonate group (at least one being a phosphonate group);

and from 40 to 80 percent of a second polymer component containing ester groups and/or a polystyrene polymer.

4,008,192

POLYISOCYANATES BLOCKED WITH HYDROXAMIC ACID ESTERS OR ACYL HYDROXAMATES

Willem Jacobus Mijs, Rozendaal (Gld.), and Johan Bernard Reesink, Didam (Gld.), both of Netherlands, assignors to Akzo N.V., Arnhem, Netherlands

Filed Nov. 28, 1975, Ser. No. 635,986

Claims priority, application Netherlands, Dec. 3, 1974, 7415726

Int. Cl.² C08G *18/04*

U.S. Cl. 260—18 TN **15 Claims**

1. A process for the preparation of thermosetting coating compositions comprising incorporating in a polymer having free hydroxyl groups an organic polyisocyanate blocked with a hydroxamic acid ester or an acyl hydroxamate.

4,008,193

STABILIZER COMBINATION FOR HALOGEN-CONTAINING POLYMERS

Franz Scheidl, and Herbert Nies, both of Gersthofen, Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Sept. 23, 1975, Ser. No. 616,071

Claims priority, application Germany, Sept. 27, 1974, 2446116

Int. Cl.² C08L *91/00*

U.S. Cl. 260—23 XA **8 Claims**

1. A stabilizer combination for halogen-containing polymers consisting of a mixture of metal salts of aliphatic mono- or dicarboxylic acids having from 6 to 40 carbon atoms, optionally alkyl or alkoxy substituted aromatic mono-, di-, or tri-carboxylic acids having from 7 to 25 carbon atoms in the molecule, the mixtures being composed of 10 to 70% by weight of an aluminum salt, 10 to 80% by weight of a calcium salt and 10 to 70% by weight of a zinc salt of the aforesaid carboxylic acids.

4,008,194

COMPOSITIONS FOR PLUGS OF REFRACTORY MATERIAL

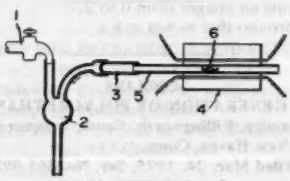
Tsuneo Shintani, Kitakyushu, Japan, assignor to Kurosaki Refractories Co., Ltd., Fukuoka, Japan

Filed Nov. 18, 1975, Ser. No. 632,946

Claims priority, application Japan, Nov. 27, 1974, 49-136677

Int. Cl.² C08L *95/00*; C04B *35/66*; C21B *7/12*

U.S. Cl. 260—28 R **6 Claims**



1. Compositions for refractory plugs of blast furnaces comprising 100 parts by weight of a refractories aggregate composition, as a binder 5–30 parts by weight of at least one petroleum pitch which has a softening point of 150°–230° C and 10 – 30 parts by weight of at least one alcohol selected from the group consisting of polyethyleneglycol and polypropyleneglycol.

4,008,195

AQUEOUS INSULATING VARNISHES

Takashi Ishizuka, and Naoki Miwa, both of Ibaraki, Japan, assignors to Nitto Electric Industrial Co., Ltd., Ibaraki, Japan

Filed Aug. 16, 1974, Ser. No. 498,020
Claims priority, application Japan, Aug. 16, 1973, 48-91849
Int. Cl.² B32B *15/08*; C08L *79/08*
U.S. Cl. 260—29.2 N 14 Claims

1. An aqueous insulating varnish which comprises an aqueous medium containing dissolved therein a resin containing ester groups, imide groups and free carboxyl groups in the resin molecule having an acid number of 20 to 100, with a volatile base selected from the group consisting of ammonia and a volatile organic amine to render the resin soluble, the resin comprising the reaction product of (A) 100 parts of a carboxyl group containing polyol containing ester groups in the molecule comprising the reaction product of

1. an organic carboxylic acid component comprising
   a. about 15 to 100 mol% of at least one of an aromatic tricarboxylic acid and the anhydride thereof in which up to 30 mol% of the aromatic tricarboxylic acid and the anhydride thereof can be replaced by at least one of an aromatic tetracarboxylic acid and the anhydride thereof, and
2. an organic alcohol component comprising at least one organic polyhydric alcohol;

B. 2.5 to 250 parts of a member selected from the group consisting of butanetetracarboxylic acid, an imide-forming derivative thereof and mixture; and

C. at least one organic diamine, the molar ratio of butanetetracarboxylic acid or said imide-forming derivative thereof to organic diamine being 1/4 to 5.

4,008,196

PROCESS FOR PREPARATION OF AMPHOTERIC RESINOUS AQUEOUS EMULSIONS

Kazuo Matsuda; Hidemasa Ohmura, both of Wakayama, and Yukihisa Niimi, Osaka, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Aug. 15, 1975, Ser. No. 605,018
Claims priority, application Japan, Aug. 20, 1974, 49-95236
Int. Cl.² C08G *18/71*; D06M *15/52*
U.S. Cl. 260—29.2 TN 10 Claims

1. A process for preparing an amphoteric polyurethane aqueous emulsion, which comprises:

1. reacting, in the liquid phase and in a ketone solvent, at a temperature of from −20° to +70° C, (A) isocyanate-terminated urethane prepolymer prepared by reacting organic polyol having a molecular weight in the range of from 200 to 10,000 with an excess of organic polyisocyanate, with (B) an excess of polyalkylene polyamine having at least two primary or secondary amino groups, the total mole number of primary and secondary amino groups in the polyalkylene polyamine being greater than the total mole number of isocyanate groups in the isocyanate-terminated urethane prepolymer, the reaction being carried out until the presence of —NCO groups cannot be detected, whereby to form polyurethane-urea-polyamine,
2. reacting with the polyurethane-urea-polyamine of step 1, a substance selected from the group consisting of alkyl isocyanates having an alkyl group containing 12 to 22 carbon atoms and a α-olefin epoxides having from 12 to 22 carbon atoms, to form an alkyl-substituted polyurethane-urea-polyamine, the amount of said substance being from 10 to 80 mole %, based on the number of moles of amino groups in the molecule of said polyurethane-urea-polyamine,
3. reacting the reaction product of step 2 with a material selected from the group consisting of β-propiolactone, δ-valerolactone, ε-caprolactone, 1,3-propane sultone and 1,4-butane sultone to render amphoteric the alkyl-substituted polyurethane-urea-polyamine, the amount of said material being from 0.5 to 2.0 moles per mole of amino groups in said alkyl-substituted polyurethane-urea-polyamine,
4. treating the reaction product of step 3 to remove the solvent therefrom and adding water thereto to form an aqueous amphoteric polyurethane emulsion.

4,008,197

MINERAL OIL EXTENDED POLYURETHANE SYSTEM CONTAINING A COUPLING AGENT FOR DECONTAMINATING AND SEALING THE INTERIOR SPACES OF AN INSULATED ELECTRICAL DEVICE

Melvin Brauer, E. Brunswick, and Thaddeus Frank Kroplinski, Bound Brook, both of N.J., assignors to N L Industries, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 432,479, Jan. 11, 1974, abandoned. This application Nov. 17, 1975, Ser. No. 632,180
Int. Cl.² C08K *5/01*, *5/07*, *5/10*
U.S. Cl. 260—31.6 8 Claims

1. A mineral oil extended polyurethane system comprising the reaction product of an isocyanate terminated prepolymer with a polyol in the presence of a mineral and a liquid coupling agent for compatibilizing said mineral oil with said polyurethane, said polyurethane system containing from about 8 to about 20 parts of said urethane polymer, from about 60 to about 75 parts mineral oil and from about 10 to about 25 parts of coupler, all parts expressed on a weight basis, said liquid coupling agent being miscible in all proportions with said mineral oil, said coupling agent selected from the group consisting of a ketone and an ester of an organic compound selected from the group consisting of a diol and a diacid, said agent having a boiling temperature above 220° F., a solubility parameter between 7.0 and 9.5 and a hydrogen bonding index number in the range from 8.2 to 8.8, said isocyanate terminated prepolymer selected from the group consisting of cycloaliphatic diisocyanate, aliphatic diisocyanate and aromatic diisocyanate; said polyol selected from the group consisting of castor oil and polyether wherein at least one of said urethane forming reactants include a hydroxy bearing polybutadiene constituent, the mineral oil extended polyurethane when cured retaining the mineral oil within its structure, thereby preventing the oil from spewing and exuding from said cured composition, said composition possessing a gel-like consistency.

4,008,198

PROCESS FOR PREPARING HIGHLY TRANSPARENT ELASTOMERS

Herbert Krohberger, Neuotting; Jürgen Burkhardt, and Jörg Patzke, both of Burghausen, all of Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed May 2, 1975, Ser. No. 574,052
Claims priority, application Germany, May 15, 1974, 2423531
Int. Cl.² C08L *83/04*
U.S. Cl. 260—37 SB 20 Claims

1. A composition which is convertible to highly transparent or optically clear elastomers comprising (1) an organopolysiloxane having a viscosity of at least 500,000 cSt at 25° C., (2) at least 0.02 percent by weight based on the weight of the organopolysiloxane (1) of a nitrogen containing compound selected from the class consisting of N-triorganosilylcarbamic acid esters, N-triorganosilylureas, O-triorganosilyloxyamines, aminoorganosiloxanes and triorganosilyloxy-N-triorganosilylamines, (3) from 4 to 40 percent by weight based on the weight of the organopolysiloxane (1) of a hexaorganodisilazane and (4) from 10 to 150 percent by weight based on the weight of the organopolysiloxane (1) of silicon dioxide having a surface area of at least 50 m^2/g.

4,008,199

HEAT STABILIZED POLYALKYLENE TEREPHTHALATE RESIN COMPOSITION

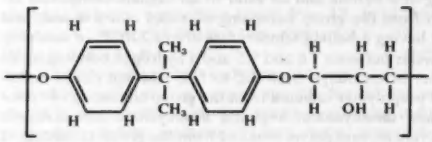
John S. Gall, North Haledon, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed June 9, 1975, Ser. No. 584,800
Int. Cl.² C08K *3/40*
U.S. Cl. 260—40 R **7 Claims**

1. In a molding resin comprising a reinforcing filler and a polyalkylene terephthalate selected from the group consisting of the polymer reaction product of 1,3-propanediol and terephthalic acid or dimethyl terephthalate and the polymer reaction product of 1,4-butanediol and terephthalic acid or dimethyl terephthalate, said polyalkylene terephthalate having an intrinsic viscosity in the range of about 0.4 to about 1.2 deciliters per gram, as measured in an 8 weight percent solution, based on the polymer weight, of orthochlorophenol at 25° C.; the improvement comprising an intimate blend of said molding resin and the combination of stabilizing amounts of additives of each of

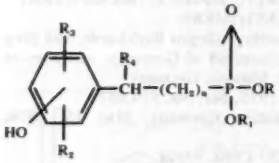
a. a linear polyamide polymer having a relative viscosity in the range from 35 to 100

b. a thermoplastic phenoxy resin having a repeating structure:



and an average molecular weight in a range from about 15,000 to about 75,000

c. an organic phosphonate of the formula:



wherein *n* is 0 or 1 and

a. when *n* is 1, each of R and R_1 is alkyl having from 12 to 24 carbon atoms and each of R_2 and R_3 is alkyl having from 1 to 6 carbon atoms, and R_4 is hydrogen; and

b. when *n* is 0,

R_2, OH and R_3 are fixed, respectively, in the 3, 4 and 5 positions of the benzene ring portion of the benzylphosphonate;

each of R and R_1 is alkyl of 14 to 30 carbon atoms,

R_2 is alkyl of from 1 to 6 carbon atoms,

R_3 is tertiary-butyl, and

R_4 is a member selected from the group consisting of hydrogen and methyl.

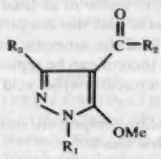
4,008,200

METHOD OF STABILIZING ORGANIC MATERIALS EMPLOYING PYRAZOLE COMPOUNDS AND STABILIZED COMPOSITIONS THEREOF

Lajos Avar, Binningen; Kurt Hofer, Munchenstein, and Martin Preiswerk, Basel, all of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Continuation-in-part of Ser. No. 485,298, July 2, 1974, abandoned, which is a continuation-in-part of Ser. No. 447,922, March 4, 1974, abandoned. This application Apr. 11, 1975, Ser. No. 567,308
Int. Cl.² C08K *1/00*
U.S. Cl. 260—45.75 N **16 Claims**

1. A method of stabilizing a natural or synthetic polymeric material susceptible to degradation under the effect of heat, oxidation or ultra-violet light which comprises treating said material with a stabilizing effective amount of a compound of the formula:



wherein

R_1 is alkyl (C_1–C_{22}); cycloalkyl (C_5–C_{12}); cycloalkyl (C_5–C_{11}) alkyl (C_1–C_7); alkyl (C_1–C_{21}) thioalkyl (C_1–C_{21}) with C_2–C_{22} in the aggregate thereof; cycloalkyl (C_5–C_{11}) alkyl (C_1–C_6) thioalkyl(C_1–C_6) with C_7–C_{18} in the aggregate thereof; aralkyl (C_7–C_{12}); aralkyl (C_7–C_{12}) substituted on the aryl nucleus by 1 or 2 hydroxyl groups, 1 or 2 alkyl (C_1–C_{12}) groups, cycloalkyl (C_5–C_{12}) and/or cycloalkyl (C_5–C_{11}) alkyl (C_1–C_{11}); phenyl; phenyl substituted by 1 to 3 halogen atoms, cyano, 1 or 2 hydroxyl groups, 1 or 2 alkyl (C_1–C_{12}) groups, 1 or 2 alkoxy (C_1–C_{12}) groups, phenyl, $-SO_3H$ and/or a radical R_4—O— or R_4—SO_2—,

wherein R_4 is phenyl or phenyl substituted by 1 or 2 alkyl (C_1–C_8) groups;

R_2 has one of the significances of R_1 or is a furan, thiophene, benzothiophene, indole, pyridine or quinoxaline radical, each of which is either unsubstituted or substituted by halogen, alkyl (C_1–C_4) and/or alkoxy (C_1–C_4) with 1 or 2 substituents in the aggregate thereof;

R_3 has one of the significances of R_1 or is cyano or —$COOR_5$,

wherein R_5 is alkyl (C_1–C_{12}), cycloalkyl-(C_5–C_{12}), cycloalkyl (C_5–C_{11}) alkyl (C_1–C_7), phenyl or phenyl substituted by hydroxy and/or 1 to 2 alkyl (C_1–C_8) groups,

and Me is hydrogen or an equivalent of a bivalent metal ion.

4,008,201

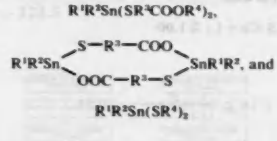
HALOGENATED RESINS STABILIZED WITH NOVEL COMPOSITIONS

Lewis B. Weisfeld, Princeton, N.J., assignor to Carlisle Chemical Works, Inc., Reading, Ohio

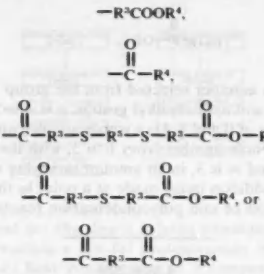
Continuation of Ser. No. 223,623, Feb. 4, 1972, abandoned. Continuation-in-part of Ser. No. 803,084, Feb. 27, 1968, Pat. No. 3,640,950, which is a continuation-in-part of Ser. No. 577,844, Sept. 8, 1966, abandoned. This application July 18, 1975, Ser. No. 597,233
The portion of the term of this patent subsequent to Feb. 8, 1989, has been disclaimed.
Int. Cl.² C08K *5/58*
U.S. Cl. 260—45.75 S **16 Claims**

1. A vinyl halide resin composition comprising a resin selected from the group consisting of polyvinyl chloride, polyvinylidene chloride, copolymers of vinyl chloride with other ethylenically unsaturated monomers and copolymers of vinyli-

dene chloride with other ethylenically unsaturated monomers and a stabilizing effective amount of a tin composition comprising in synergistic combination a diorganotin mercapto compound having a formula selected from the group consisting of



and a monoorganotin compound having the formula $R^1Sn(Z)_n(Z'Y)_{3-2n}$ wherein R^1 and R^2 are methyl or butyl, Z and Z' are each oxygen or sulfur, n is zero to 1.5 and Y is hydrogen, alkyl, cycloalkyl,



wherein R^3 is alkylene, alkenylene, cycloalkylidene, cycloalkylene, arylene, alkarylene or aralkylene, R^4 is hydrogen, alkyl, aryl, cycloalkyl or aralkyl, R^5 is alkylene, cycloalkylidene, alkylidene, alkenylidene or cycloalkylene, said monoorganotin compound being present in amount sufficient to provide tin in amount from 50 to 98 percent by weight of the total tin content of the combination of said diorganotin mercapto compound and said monoorganotin compound.

4,008,202

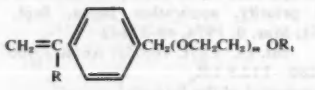
AQUEOUS THICKENING AGENTS DERIVED FROM VINYL BENZYL ETHER POLYMERS

Syamalarao Evani, and Frederick P. Corson, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed June 29, 1972, Ser. No. 267,570
Int. Cl.² C08F *15/10, 15/14, 15/02*
U.S. Cl. 260—47 UA **11 Claims**

1. A polymer comprising in polymerized form

a. about 0.2 to 15 mole percent of a vinyl benzyl ether monomer having the formula



wherein R is hydrogen or methyl and R_1 is an alkyl, alkaryl or aralkyl group of 10 to about 22 carbon atoms, and m is about 10 to 100, and;

b. the balance to make 100 mole percent of one or more copolymerizable monomers provided a water solubilizing amount of at least one monomer having a carboxylic acid group, an anhydride group, a sulfate group, a sulfonate group or a hydroxyl group is present.

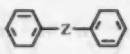
4,008,203

POLYSULPHONES AND METHOD OF PREPARATION

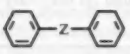
Michael Edward Benet Jones, Hitchin, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Oct. 31, 1963, Ser. No. 320,508
Claims priority, application United Kingdom, Nov. 6, 1962, 41976/62; Mar. 18, 1963, 10592/63
Int. Cl.² C08G *75/20, 75/23*
U.S. Cl. 260—49 **48 Claims**

1. A film-forming polymeric material selected from the group consisting of (i) polymers consisting essentially of repeating units having the structure —Ar—SO_2— and (ii) polymers consisting essentially of units having the structure —Ar—SO_2— and units having the structure —Ar—CO— where Ar is selected from (a) a divalent aromatic radical obtained by removal of two aromatically bound hydrogen atoms from a compound selected from the group consisting of benzene, polynuclear hydrocarbons containing not more than two aromatic rings, diphenyl, compounds having the structure



where Z is selected from the group consisting of —O— and —S— and where said compound contains two aromatic rings, one of said hydrogen atoms being removed from each ring, and (b) substituted derivatives of said divalent aromatic radicals in which at least one of the aromatically bound hydrogen atoms is substituted by a monovalent radical selected from the group consisting of halogen atoms, alkyl groups containing from 1 to 4 carbon atoms and alkoxy groups containing from 1 to 4 carbon atoms, at least some of the Ar units being a radical derived from said compounds of the structure



or said substituted derivatives thereof.

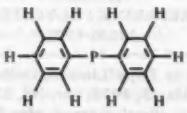
4,008,204

POLYSULPHONES AS INSULATORS

Michael Edward Benet Jones, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

Continuation of Ser. No. 126,970, March 22, 1971, abandoned, which is a division of Ser. No. 320,508, Oct. 31, 1963. This application Aug. 25, 1972, Ser. No. 283,656
Claims priority, application United Kingdom, Nov. 6, 1962, 41976/62; Mar. 18, 1963, 10592/63; Oct. 3, 1963, 38973/63
Int. Cl.² C08G *75/20, 75/23*
U.S. Cl. 260—49 **11 Claims**

1. Switch gear containing as electrical insulant a shaped polymeric material formed of repeating units having the structure —Ar—SO_2— where Ar is a divalent aromatic residue derived from benzene, a polynuclear hydrocarbon, diphenyl, a compound having the structure



where P is —O—, —S—, —SO—, a divalent hydrocarbon radical, a substituted divalent hydrocarbon radical or a residue of a diol containing only carbon atoms or groups of the structure —C—O—C— or —C—S—C— in the chain between the hydroxyl groups, or substituted derivatives of any such aromatic residues in which one or more of the hydrogen atoms

bound to the aromatic rings are substituted by other monovalant atoms or groups, and Ar may vary from unit to unit in the polymer chain.

4,008,205

POLYSULPHONES AS INSULATORS

Michael Edward Benet Jones, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

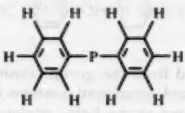
Continuation of Ser. No. 126,894, March 22, 1971, abandoned, which is a division of Ser. No. 320,508, Oct. 31, 1963. This application Aug. 25, 1972, Ser. No. 283,655

Claims priority, application United Kingdom, Nov. 6, 1962, 41976/62; Mar. 18, 1963, 10592/63; Oct. 3, 1963, 38973/63

Int. Cl.² C08G *75/20, 75/23*

U.S. Cl. 260—49 **11 Claims**

1. Transformer parts containing as electrical insulant a shaped polymeric material formed of repeating units having the structure $-Ar-SO_2-$ where Ar is a divalent aromatic residue derived from benzene, a polynuclear hydrocarbon, diphenyl, a compound having the structure



where P is —O—, —S—, —SO—, a divalent hydrocarbon radical, a substituted divalent hydrocarbon radical or a residue of a diol containing only carbon atoms or groups of the structure —C—O—C— or —C—S—C— in the chain between the hydroxyl groups, or substituted derivatives of any such aromatic residues in which one or more of the hydrogen atoms bound to the aromatic rings are substituted by other monovalent atoms or groups, and Ar may vary from unit to unit in the polymer chain.

4,008,206

SOLID STATE POLYMERIZATION

Gary R. Chipman, Naperville, and Ronald E. Bockrath, Aurora, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Oct. 2, 1974, Ser. No. 511,166

Int. Cl.² C08G *63/26*

U.S. Cl. 260—75 M **7 Claims**

1. The method of producing a relatively high inherent viscosity polyester resin without agglomeration which comprises polymerizing a polyester having an initial starting inherent viscosity of about 0.3 – 0.7 dl/g under solid state polymerization conditions together with an organic crystalline polycarboxylic acid anti-stick agent having a melting point of at least 230° C wherein said anti-stick agent is present in a concentration of 0.05 – 10 parts by weight per each 100 parts by weight polyester and the inherent viscosity is determined in a 60:40 phenol: tetrachloroethane at 30° and 0.4 g/dl.

4,008,207

PROCESS FOR PREPARING POLYESTERS FOR OPAQUE FILM USE

Yorihiko Omoto, and Teruo Matsunaga, both of Matsuyama, Japan, assignors to Teijin Limited, Osaka, Japan

Filed May 5, 1975, Ser. No. 574,733

Claims priority, application Japan, May 11, 1974, 49-51744

Int. Cl.² C08G *63/14*

U.S. Cl. 260—75 R **4 Claims**

1. In preparing a polyester by carrying out the ester-interchange reaction of a lower alkyl ester of terephthalic acid and a glycol and thereafter effecting the polycondensation reaction of the resulting product, the improvement for preparing a polymer for opaque film use which comprises carrying out said ester-interchange reaction in the presence of a calcium compound and a lithium compound having ester-interchange catalysis capacities in amounts satisfying all of the following relationships:

$$0.03 \leqq Ca \leqq 0.50 \quad 1.$$

$$0.10 \leqq Li \leqq 0.80 \quad 2.$$

$$0.30 \leqq 0.5\ Ca + Li \leqq 1.00 \quad 3.$$

and

$$0.10 \leq \frac{P}{0.5\ Ca + Li} \leq 0.55 \quad (4)$$

wherein Ca, Li and P are respectively the mol percentages of calcium, lithium and phosphorus compounds based on the lower alkyl ester of terephthalic acid, and thereafter adding to the reaction system a phosphorus compound of the formula

$$(HO)_l\text{—}\overset{\overset{(O)_n}{\|}}{P}\text{—}(OR)_m \quad (5)$$

wherein R is a member selected from the group consisting of the alkyl, aryl and hydroxyalkyl groups, n is selected from the class consisting of 0 and 1, l is a whole number up to 2, including 0, m is a whole number from 1 to 3, with the proviso that the sum of l and m is 3, in an amount satisfying said relationship (4), the addition being made at a point in the process up until completion of said polycondensation reaction.

4,008,208

COMPOSITIONS HAVING INHIBITED ABILITY TO PROMOTE PLATELET AGGREGATION OR FIBRIN CLOT FORMATION

Daniel Lednicer, Portage, and Edward E. Nishizawa, Schoolcraft, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 258,016, May 30, 1972, Pat. No. 3,888,833. This application Mar. 17, 1975, Ser. No. 559,333

Int. Cl.² C08F *8/36, 28/02*

U.S. Cl. 260—79.3 R **9 Claims**

1. A composition which comprises a sulfonyl aromatic diazonium salt chemically bonded at the sulfonyl grouping through a nitrogen-containing bond to a material which is susceptible to interaction with a nitrene which induces deposition of blood cells and fibrin when in contact with mammalian blood.

4,008,209

NONAPEPTIDE AMIDE ANALOGS OF LUTEINIZING RELEASING HORMONE

Masahiko Fujino, Takarazuka; Tsunehiko Fukuda, and Susumu Shinagawa, both of Osaka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 509,357, Sept. 24, 1974, abandoned. This application July 11, 1975, Ser. No. 595,308

Claims priority, application Japan, Sept. 29, 1973, 48-109951; Mar. 8, 1974, 49-27442

Int. Cl.² C07C *103/52;* A61K *37/00*

U.S. Cl. 260—112.5 LH **16 Claims**

1. A compound of the formula

(Pyr)Glu-His-Trp-Ser-R_1-R_2-R_3-Arg-Pro-NH-R_4

wherein

R_1 is Tyr or Phe,

R_2 is D-Nle, D-Nva, D-Abu, α-Aibu, D-Phe or D-Ser,

R_3 is Leu, Ile or Nle, and

R_4 is alkyl of 1 to 3 carbon atoms which may be substituted with hydroxyl.

4,008,210

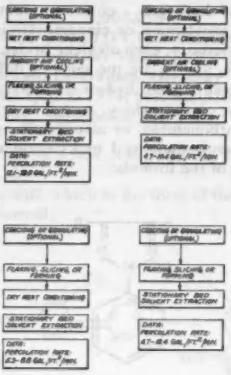
SOLVENT EXTRACTION OF OIL FROM OIL SEEDS

Bobby C. Steele, Conyers; Douglas R. Barr, Norcross; Charles T. Hunt, Lithonia, and James L. Ayres, Stone Mountain, all of Ga., assignors to Gold Kist Inc., Lithonia, Ga.

Filed Nov. 5, 1974, Ser. No. 521,145

Int. Cl.[2] A23J 1/14; C11B 1/10

U.S. Cl. 260—123.5 **21 Claims**



1. A method for the direct solvent extraction of oil from peanuts to produce a low-fat proteinaceous material which comprises, wet heat conditioning at a temperature of from 160° to 240° F whole peanuts, peanut splits, peanut granules, or cracked peanuts to a moisture content of more than 6 but less than 12%, flaking said wet heat conditioned peanuts, dry heat conditioning said flaked peanuts to a moisture content of from 1.9 to 6% and treating said dry heat conditioned flakes with a solvent selected from the group consisting of alcohols, ketones, hydrocarbons, and halogenated hydrocarbons, for the removal of oil contained in said flakes.

4,008,211

BETAINIC AZO DYESTUFFS CONTAINING COBALT IN COMPLEX UNION WITH A COLORLESS, TRIDENTATE LIGAND

Paul Lienhard, Riehen near Basel; Fabio Beffa, Basel, and Charles Soiron, Riehen near Basel, all of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Continuation of Ser. No. 57,017, June 9, 1970, abandoned, which is a division of Ser. No. 496,651, Oct. 15, 1965, abandoned. This application July 30, 1973, Ser. No. 383,697

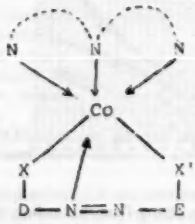
Claims priority, application Switzerland, Oct. 20, 1964, 13579/64

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.[2] C09B 45/20, 45/30; D06P 3/24

U.S. Cl. 260—147 **7 Claims**

1. A betainic cobalt complex dyestuff of the formula



wherein the symbol

represents a member selected from the group consisting of diethylenetriamine, dipropylenetriamine and monoethylene-mono-propylene-triamine, said triamines being unsubstituted or N-lower alkyl-substituted,

α,β,γ-triaminopropane,
α,β,δ-triaminobutane,
α,γ-diamino-β-(aminomethyl)-propane,
N,N-bis-(β-phenylaminoethyl)-N-ethylamine,
N,N''-dibenzyldiethylenetriamine,
N,N-bis-(β-N'-piperidinoethyl)-N-ethylamine,
1-amino-2-(β-amino-ethylamino)-cyclohexane,
2,2'-diaminodicyclohexylamine,
1-amino-2-(β-amino-ethylamino)-benzene,
2,2'-diamino-diphenylamine,
2,6-(di-2'-pyridyl)-pyridine,
8-(2'-amino-phenylamino)-quinoline,
(2-pyridylmethylene-aminoethyl)-diethylamine,
1-(diethylamino)-2-(2'-pyridyl-methylene-amino)-benzene,
1-(dimethylamino)-2-(2'-pyridyl-methylene-amino)-cyclohexane,
2-(2'-pyridyl-methylene-amino-methyl)-pyridine,
8-(2'-pyridyl-methyleneamino)-quinoline,
2,6-bis-(benzyl-aminomethylene)-pyridine,
2,6-bis-(aminomethyl)-pyridine,
pyridine-2,6-dialdehyde dioxime,
pyridine-2,6-dialdehyde-dihydrazone,
2-methoxy-4,6-dihydrazino-1,3,6-triazine and
2-amino-4,6-dihydrazino-1,3,5-triazine; and

wherein

—D—N=N—E— is the divalent radical of a dyestuff selected from a benzene-azo-benzene dyestuff, a benzene-azo-naphthalene dyestuff, a benzene-azo-(1-phenyl-5-hydroxy-pyrazole) dyestuff, a benzene-azo-(1-phenyl-5-amino-pyrazole) dyestuff, a benzene-azo-acylaceto-phenylamide dyestuff, a benzene-azo-benzene-azo-naphthalene dyestuff, a naphthalene-azo-naphthalene dyestuff and a naphthalene-azo-(1-phenyl-5-hydroxy-pyrazole) dyestuff, any substituents of said dyestuffs being selected from hydrogen, chlorine, brome, lower alkyl, lower alkoxy, nitro, hydroxyl, lower-alkyl-sulfonyl, phenylsulfonyl, methylphenylsulfonyl, methyphenylsulfonylamino, methylsulfonylamino, acetylamino, carbo-ethoxy-amino, a radical of the formula

wherein

R_1 represents hydrogen, lower alkyl, hydroxyethyl, phenyl or lower alkylphenyl and R_2 represents hydrogen, lower alkyl or hydroxyethyl; carboxylic acid-N-phenylamide and lower alkyl carbonyl, phenoxycarbonyl, phenylazo or naphthylazo; and wherein one $—SO_3^-$ group is attached to either D or E;

X is linked in ortho-position to the azo bridge to a ring carbon atom of D and represents —O—, —COO— or lower-alkylsulfonamido, and

X' is linked in ortho-position to the azo bridge to a ring carbon atom of E and represents —O—, —N—(lower alkyl)—, —N—(hydroxy-lower-alkyl), —N—(phenyl)— or —NH—, said dyestuff being capable of forming a bicyclic metal complex with cobalt;

and wherein said lower alkyl and lower alkoxy moieties have from one to five carbon atoms.

4,008,212
MONOAZO DYE MIXTURES DERIVED FROM 7-AMINO-4-NITROBENZOTRIAZOLE AND BIS-HYDROXYALKYLAMINO ACYLANILIDES REACTED WITH ACID HALIDES AND AMIDES

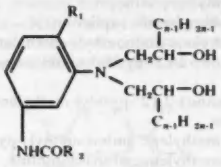
Edgar E. Renfrew, Flemington, Pa., assignor to American Color & Chemical Corporation, Charlotte, N.C.

Division of Ser. No. 374,771, June 28, 1973, Pat. No. 3,860,389. This application Apr. 4, 1974, Ser. No. 457,979
Int. Cl.² C09B *29/08, 29/26, 43/18*
U.S. Cl. 260—157 **7 Claims**

1. The monoazo dyestuff consisting essentially of the reaction product of

a. the diazo base of 7-amino-4-nitrobenzotriazole; and

b. a coupling component of the formula



wherein R_1 is H or lower alkoxy; R_2 is an alkyl radical having 1–4 carbon atoms, phenyl, tolyl, or chlorophenyl; and n has a value of 1–2; the hydroxyalkyl groups of the coupling component being reacted prior or subsequent to coupling with at least stoichiometric quantities of both:

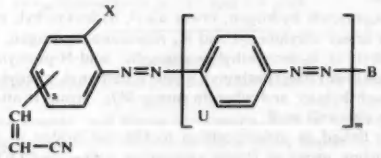
1. a lower alkyl chlorocarbonate, lower alkanoyl chloride, benzoylchloride, methylbenzoylchloride, ethylbenzoyl chloride, phthaloyl chloride, isophthaloyl chloride, terephthaloyl chloride or lower alkylsulfonyl chloride, and
2. a mono- or di-lower alkyl formamide or acetamide, at a temperature of 30°–100° C. until the reaction mixture is substantially free of unreacted hydroxyalkyl groups.

4,008,213
AZO DYESTUFFS CONTAINING A CINNAMONITRILE RESIDUE

Claude Marie Henri Emile Brouard, Sotteville-les-Rouen; Jean Marie Louis Leroy, St. Etienne du Rouvray, and Jean-Pierre Henri Stiot, Saint Pierre les Elbeuf, all of France, assignors to Ugine Kuhlmann, Paris, France

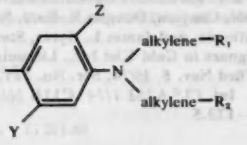
Filed Mar. 11, 1971, Ser. No. 123,414
Claims priority, application France, Mar. 12, 1970, 7008829
Int. Cl.² C09B *29/08, 29/10, 29/26, 29/28*
U.S. Cl. 260—160 **3 Claims**

1. Dyestuffs of the formula:



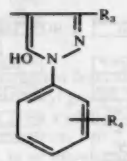
in which the radical — CH=CH—CN is fixed in the 4- or 5-position, X is hydrogen or chlorine, U is hydrogen, chlorine, alkyl containing 1 to 4 carbon atoms, alkoxy containing 1 to 4 carbon atoms, benzoylamino, cinnamoylamino, or aliphatic acylamino containing up to 2 carbon atoms, m is zero or one, and B is

a. the radical of the formula:



wherein Y is hydrogen, chlorine, methyl, methoxy, acetylamino, benzoylamino or cinnamoylamino, Z is hydrogen, methyl or methoxy, each alkylene bridge contains 1 to 4 carbon atoms, R_1 and R_2 are the same or different and each represent hydrogen, cyano, hydroxy, alkoxycarbonyl, acetyloxy, benzoyloxy, cinnamoyloxy, acetyl, benzoyl, cinnamoyl, alkylsulfonyl, carbonamido, or alkoxycarbonyloxy, the alkyl and alkoxy groups containing 1 to 4 carbon atoms.

b. the radical of the formula:



wherein R_3 is hydrogen, methyl, carbonamido, N-alkyl- or N,N-dialkylcarbonamido, or alkoxycarbonyl, the alkyl and alkoxy groups containing 1 to 4 carbon atoms, and R_4 is hydrogen, chlorine, cyano, nitro, methyl or sulphonamido,

c. the p-hydroxyphenyl, 2-hydroxy-5-methylphenyl, 2-acetylamino-4-hydroxyphenyl, 2-hydroxy-1-naphthyl, or (dioxy-4,4 thiomorpholino)-4 phenyl radical,

d. the 3-hydroxy-2-dibenzofuranyl or 7-hydroxy-8-coumarinyl radical,

e. the 7-hydroxy-4-indazolyl radical,

f. the 2-hydroxy-3-carboazolyl radical,

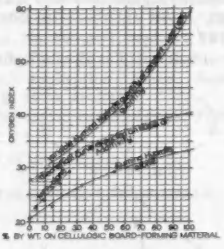
g. the N-alkyl-4-hydroxy-2-oxo-3-quinolinyl radical, alkyl containing 1 to 4 carbon atoms or,

h. the 2-phenyl-3-indolyl radical.

4,008,214
SYNERGISTIC FLAME-RETARDING COMPOSITIONS FOR CELLULOSIC BOARDS

Igor Sobolev, Orinda, and Erwin Panusch, Livermore, both of Calif., assignors to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Filed Dec. 8, 1975, Ser. No. 638,401
Int. Cl.² C08L *1/02*
U.S. Cl. 260—17.3 **16 Claims**



1. A synergistically acting flame-retarding composition for cellulosic boards which comprises alumina hydrate in combination with an organic, phosphate-containing compound se-

lected from the group consisting essentially of melamine-formaldehyde-phosphate, urea-formaldehyde-phosphate and dicyandiamide-formaldehyde phosphate, wherein the alumina hydrate quantity is not less than 30% by weight of the flame-retarded board and the organic, phosphate-containing compound in the board is in the range of about 8 to about 22% by weight of the board forming cellulosic material.

4,008,215

SULFONIC-ACID SUBSTITUTED DISAZO DYESTUFFS

Hans Kramb, San Cugat del Valles, Spain, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

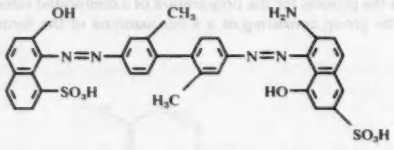
Filed Oct. 9, 1974, Ser. No. 513,240

Claims priority, application Germany, Oct. 12, 1973, 2351293

Int. Cl.² C09B *35/08, 33/02, 31/02;* **D06P** *3/06*

U.S. Cl. 260—183 **1 Claim**

1. Disazo dyestuff, which in the form of the free acid corresponds to the formula



4,008,216

BENZENESULPHONYLBENZENESULPHONAMIDEAZOPHENYL-OR-NAPHTHYL-AZOLHYDROXYLOWERALKOXYPHENYL DYESTUFFS

Richard Sommer, Leverkusen, and Gerhard Wolfrum, Bergisch-Neukirchen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

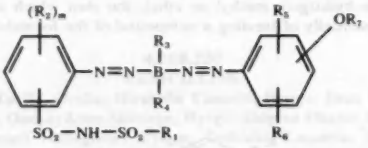
Filed Mar. 3, 1975, Ser. No. 554,616

Claims priority, application Germany, Mar. 9, 1974, 2411291

Int. Cl.² C09B *31/06, 43/00;* **D06P** *1/06, 3/24*

U.S. Cl. 260—186 **11 Claims**

1. Disazo dyestuff which in the form of the free acid corresponds to the formula



wherein

B is 5,6,7,8-tetrahydro-1,4-naphthylene, 1,4-naphthylene, or 1–4 phenylene;

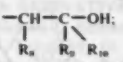
R_1 is phenyl; phenyl substituted by C_1–C_4-alkyl, C_1–C_4-alkoxy, halogen, nitrile, or nitro; C_1–C_4-alkyl;

R_2 is chlorine, bromine, or alkyl or alkoxy having 1–4 carbon atoms;

R_3 and R_4 independently of one another are hydrogen, chlorine, bromine, or alkoxy or alkyl having 1–4 carbon atoms;

R_5 and R_6 independently of one another are hydrogen, alkyl having 1–4 carbon atoms, or alkoxy having 1–4 carbon atoms;

R_7 represents



R_8 and R_{10} independently of one another are hydrogen or methyl;

R_9 is methyl, ethyl, phenyl, hydroxymethyl, C_1–C_4-alkoxymethyl, benzyloxymethyl, C_1–C_4-alkyl-carbonyloxymethyl or C_2–C_4-alkenylcarbonyloxymethyl;

the radical OR_7 is in the o- or p- position relative to the azo bridge, and

m is a number from 0 to 2.

4,008,217

1'-VARIABLE-1',1'-DIHALO-HALOBENZENEAZOMETHANES

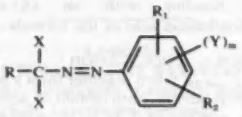
Malcolm W. Moon, Kalamazoo, and Victor L. Rizzo, Paw Paw, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 468,767, May 10, 1974, abandoned, which is a division of Ser. No. 138,269, April 28, 1971, Pat. No. 3,834,892. This application Nov. 5, 1975, Ser. No. 629,014

Int. Cl.² A01N *9/24;* **C07C** *107/00*

U.S. Cl. 260—192 **19 Claims**

1. A 1'-variable-1',1'-dihalo-halobenzeneazomethane of the structural formula



wherein R is hydrogen; alkyl of from 1 to 7 carbon atoms, inclusive; cycloalkyl of from 3 to 7 carbon atoms, inclusive; haloalkyl of from 1 to 7 carbon atoms, inclusive; halocycloalkyl of from 3 to 7 carbon atoms, inclusive; alkoxyalkyl of from 2 to 8 carbon atoms, inclusive; hydroxyalkyl of from 1 to 7 carbon atoms, inclusive; and phenyl optionally having 1, 2, or 3 substituents, e.g., halogen atoms, lower-alkyl of from 1 to 4 carbon atoms, inclusive, halolower-alkyl of from 1 to 4 carbon atoms, inclusive, and lower-alkoxy of from 1 to 4 carbon atoms, inclusive; the X's are independently bromine, chlorine, or fluorine; m is an integer 0, 1, 2, or 3; and R_1, R_2, and Y are independently halogen, lower-alkyl of from 1 to 4 carbon atoms, inclusive; halolower-alkyl of from 1 to 4 carbon atoms, inclusive; or lower-alkoxy of from 1 to 4 carbon atoms, inclusive; providing however, that at least one R_1 and R_2 is halogen, and that the sum of the carbon atoms in substituents R_1, R_2, and Y may not be more than 15.

4,008,218

1-N-((S)-α-SUBSTITUTED-ω-AMINOACYL)-NEAMINE OR -RIBOSTAMYCIN AND THE PRODUCTION THEREOF

Eiichi Akita, Kamakura; Tsutomu Tsuchiya, Yokohama; Shinichi Kondo, Yokohama; Shuntaro Yasuda, Yokohama; Sumio Umezawa, and Hamao Umezawa, both of Tokyo, all of Japan, assignors to Meiji Seiki Kaisha, Ltd., Tokyo, Japan

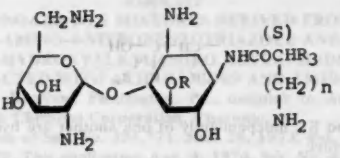
Division of Ser. No. 390,217, Aug. 21, 1973. This application Mar. 19, 1975, Ser. No. 559,771

Claims priority, application Japan, Aug. 25, 1972, 47-84633

Int. Cl.² C07G *11/00*

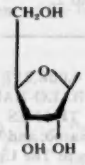
U.S. Cl. 536—17 **2 Claims**

1. A process for the production of a 1-N-((S)-α-substituted-ω-aminoalkanoyl-neamine or -ribostamycin of the formula:



(II)

wherein R is a hydrogen atom or β-D-ribofuranosyl group of the formula:



and R_3 is hydroxyl, amino or acetylamino and n is a whole number of 1 to 4, which consists essentially of the following four steps:

a. reacting neamine or ribostamycin with trifluoroacetic acid in an organic solvent to prepare neamine tetra-trifluoro-acetate or ribostamycin tetra-trifluoroacetate;

b. esterifying at random the hydroxyl groups of the neamine tetra-trifluoroacetate or ribostamycin tetra-trifluoroacetate by reacting with an (S)-α-substituted-ω-phthalimidoalkanoic acid of the formula:

$R_1'R_2'N-(CH_2)_n-CH(R_3)-COOH$

wherein R_1' and R_2' taken together form a phthaloyl group, R_3 is hydroxyl, amino, phthalimido or acetylamino, and *n* is a whole number of 1 to 4, to prepare a mixture of differently O-(S)-α-substituted-ω-phthalimidoalkanoylated neamine tetra-trifluoroacetates or ribostamycin tetra-trifluoroacetate;

c. treating the whole mixture of said differently O-(S)-α-substituted-ω-phthalimidoalkanoylated products with aqueous hydrazine or a basic anion-exchange resin, to effect the liberation of the trifluoroacetic acid, the removal of the phthaloyl group and the migration of the (S)-α-substituted-ω-aminoalkanoyl group from the 6-hydroxyl group to the 1-amino group of the neamine or ribostamycin moiety simultaneously, whereby the desired 1-N-((S)-α-substituted-ω-aminoalkanoyl)-neamine or -ribostamycin is formed, and

d. recovering said desired 1-N-((S)-α-substituted-ω-aminoalkanoyl)-neamine or -ribostamycin.

4,008,219

4-BENZAZONINE DERIVATIVES AND PROCESS FOR PREPARATION THEREOF

Masao Ikeda; Shigeo Miyamoto; Thutomu Nozawa; Akira Kurobe, all of Toyama, and Osamu Futsukaichi, Shinminato, all of Japan, assignors to Nihon Iyakuhin Kogyo Co., Ltd., Japan

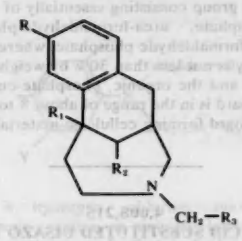
Filed May 6, 1974, Ser. No. 467,520

Claims priority, application Japan, May 8, 1973, 48-51458; May 8, 1973, 48-51459; May 8, 1973, 48-51460; May 8, 1973, 48-51461; Jan. 16, 1974, 49-7683; Feb. 5, 1974, 49-15282; Feb. 5, 1974, 49-15281

Int. Cl.[2] C07D *225/06*

U.S. Cl. 260—239 BB **18 Claims**

1. A compound selected from the group consisting of a 4-benzazonine of the formula:



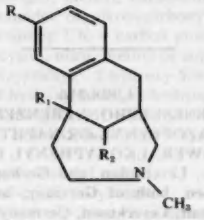
and the pharmaceutically acceptable acid addition salts thereof, wherein R is hydrogen, hydroxy or alkoxy of up to 3 carbon atoms;

R_1 is hydrogen or alkyl of up to 3 carbon atoms;

R_2 is hydrogen, methyl or ethyl; and

R_3 is hydrogen, straight or branched alkyl of up to 4 carbon atoms, straight or branched alkenyl of up to 4 carbon atoms, mono- or dihydroxyalkyl of up to 2 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, phenyl, or phenylmethyl.

7. In the process for the preparation of a compound selected from the group consisting of a 4-benzazonine of the formula:

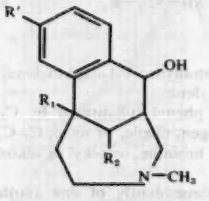


and the pharmaceutically acceptable acid addition salts thereof, wherein

R is hydrogen or hydroxy;

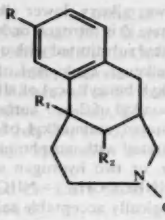
R_1 is hydrogen or alkyl of up to 3 carbon atoms; and

R_2 is hydrogen, methyl or ethyl; the step which consists essentially of treating a compound of the formula:



wherein R' is hydrogen or methoxy and each of R_1 and R_2 are as herein defined with hydriodic acid and red phosphorus.

8. In the process for the preparation of a compound selected from the group consisting of a 4-benzazonine of the formula:



and the pharmaceutically acceptable acid addition salts thereof, wherein

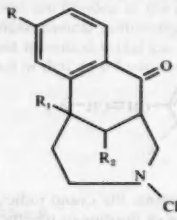
R is hydrogen or alkoxy of up to 3 carbon atoms;

R_1 is hydrogen or alkyl of up to 3 carbon atoms;

R_2 is hydrogen, methyl or ethyl; and

R_3 is hydrogen, straight or branched alkyl of up to 4 carbon atoms, mono- or dihydroxyalkyl of up to 2 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, phenyl or phenylmethyl,

the steps which consists essentially of hydrogenating a compound of the formula:



in a polar solvent over a palladium catalyst at a temperature of at least about 50° C.

4,008,220

PENICILLINS

Hisao Tobiki, Osaka; Hirotada Yamada, Hyogo; Iwao Nakatsuka, Osaka; Kozo Shimago, Hyogo; Shigeru Okano, Hyogo; Takenari Nakagome, Hyogo; Toshiaki Komatsu, Hyogo; Akio Izawa, Osaka; Hiroshi Noguchi, Hyogo, and Yasuko Eda, Osaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan

Continuation-in-part of Ser. No. 341,723, March 15, 1973, abandoned. This application Aug. 8, 1974, Ser. No. 495,914

Claims priority, application Japan, Mar. 15, 1972, 47-26759

Int. Cl.[2] C07D *499/48*

U.S. Cl. 260—239.1 **20 Claims**

1. D-α-(4-Ethoxycarbonyloxy-2,3-cyclopenteno-pyridine-5-carboxamido)benzylpenicillin and non-toxic, pharmaceutically acceptable salts thereof.

2. D-α-(4-Hydroxy-2,3-cyclopentenopyridine-5-carboxamido)benzylpenicillin and non-toxic, pharmaceutically acceptable salts thereof.

4,008,221

6-[(2,4-DIOXO-1-PYRIMIDINYL)ACYLAMINO]PENICILLIN DERIVATIVES

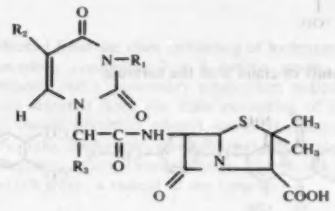
Ronald E. Bambury; Michael L. Edwards, both of Cincinnati, and Laird F. Miller, Loveland, all of Ohio, assignors to Richardson-Merrell Inc., Wilton, Conn.

Division of Ser. No. 413,564, Nov. 7, 1973, Pat. No. 3,956,288. This application Feb. 9, 1976, Ser. No. 656,653

Int. Cl.[2] C07D *499/48*

U.S. Cl. 260—239.1 **4 Claims**

1. A 6-[(2,4-dioxo-1-pyrimidinyl)acylamino]penicillin derivative having the formula:



wherein

R_1 is hydrogen and methyl;

R_2 is selected from the group consisting of hydrogen, halogen, hydroxyl, lower alkyl, trifluoromethyl, nitro, amino, acetyl, cyano, carboxy, carbomethoxy and carbethoxy;

R_3 is selected from the group consisting of hydrogen, methyl, phenyl, carboxy, carbomethoxy and carbethoxy; and the pharmaceutically acceptable salts thereof.

4,008,222

ANTHRAQUINONE DYESTUFFS

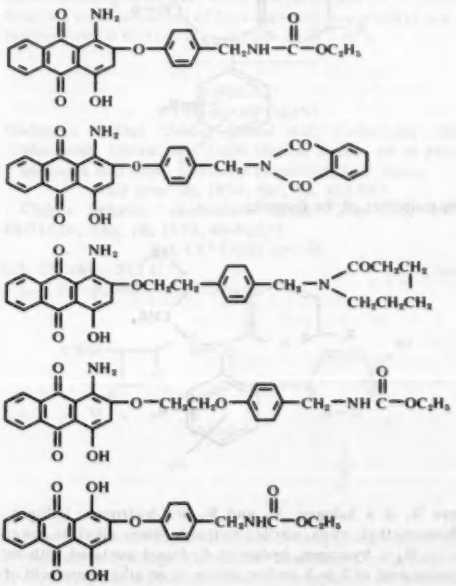
Heinz Machatzke, Leverkusen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Dec. 16, 1966, Ser. No. 602,140

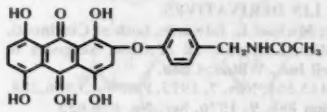
Int. Cl.[2] C07D *223/10*; **C07C** *49/95*

U.S. Cl. 260—239.3 T **8 Claims**

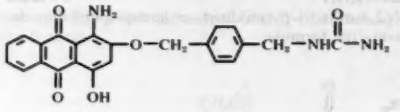
1. Dyestuff selected from the group consisting of



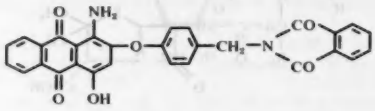
-continued



and



3. Dyestuff of claim 1 of the formula



4,008,223

6-AZA-3H-1,4-BENZODIAZEPINES

Walter Von Bebenburg, Buchschlag, and Heribert Offermanns, Grossauheim, both of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

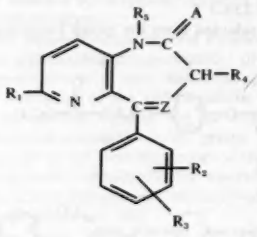
Continuation-in-part of Ser. No. 313,542, Dec. 8, 1972, abandoned. This application Sept. 19, 1974, Ser. No. 507,605

Claims priority, application Austria, Dec. 9, 1971, 10604/71; Argentina, Mar. 20, 1974, 252867

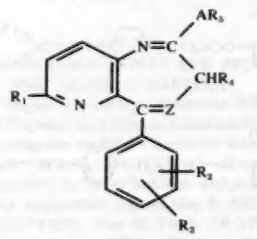
Int. Cl.² C07D *471/04*

U.S. Cl. 260—239.3 B **14 Claims**

1. A compound of the formula:



or its tautomer of the formula:



where R_1 is a halogen, R_2 and R_3 are hydrogen, halogen, trifluoromethyl, nitro, nitrile, hydroxy, lower alkyl or lower alkoxy, R_4 is hydrogen, hydroxyl, hydroxyl acylated with an alkanoic acid of 2 to 6 carbon atoms or an alkandioic acid of 3 to 6 carbon atoms, lower alkoxy, lower alkyl, benzyl, carboxyl or carb-lower alkoxy, Z is nitrogen or NO, R_5 is hydrogen, lower alkyl, lower alkyl substituted with cycloalkyl of 3 to 6 carbon atoms, lower alkenyl, cycloalkyl of 3 to 6 carbon atoms, hydroxy lower alkyl, benzyl, acyl of alkanoic acid of 2 to 6 carbon atoms, aminoalkyl of 2 to 7 carbon atoms, mono or di lower alkyl substituted aminoalkyl of 2 to 7 carbon atoms, lower alkyl substituted with morpholino or piperidino, and A is oxygen, sulfur, or two hydrogen atoms or in the tautomeric form $—NHNHCOCH_3$, $—NHCH_3$, $—OR_5$ or $O—SR_5$ and pharmacologically acceptable salts thereof.

4,008,224

PROCESS FOR THE MANUFACTURE OF CYANO-SUBSTITUTED STILBENE COMPOUNDS

Adolf Emil Siegrist, Basel, and Vincenzo Coviello, Marly, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

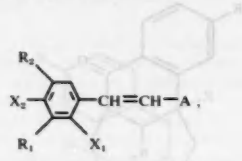
Filed Oct. 30, 1974, Ser. No. 519,164

Claims priority, application Switzerland, Nov. 19, 1973, 16246/73; Nov. 19, 1973, 16247/73

Int. Cl.² C07D *307/78, 307/79*

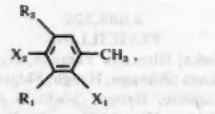
U.S. Cl. 260—240 CA **11 Claims**

1. A process for the manufacture of cyano-substituted stilbene compounds of the formula



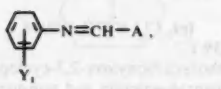
(I)

wherein either X_1 represents the cyano radical and X_2 represents hydrogen, chlorine or fluorine or together with R_1 represents a fused benzene ring, or X_2 represents the cyano radical and X_1 represents hydrogen, chlorine or alkyl with 1 to 4 carbon atoms or together with R_1 represents a fused benzene ring, R_1 represents hydrogen, chlorine, fluorine or alkoxy with 1 to 4 carbon atoms or together with X_1 or X_2 represents a fused benzene ring, R_2 represents hydrogen, chlorine, fluorine or alkoxy with 1 to 4 carbon atoms and A represents a dibenzofuran-3-yl, 4-(benzo[b] furan-2-yl)-phenyl or 2-phenyl-benzo[b] furan-6-yl radical, which is unsubstituted or substituted by chlorine and/or alkoxy with 1 to 4 carbon atoms which comprises reacting a toluene derivative of the formula



(III)

wherein X_1, X_2, R_1 and R_2 have the meaning given above, with a Schiff's base of the formula



(IV)

wherein Y_1 represents chlorine or hydrogen, and A has the meaning given above, in dimethyl formamide and in the presence of sodium alcoholate at a temperature of 0° to 40° C.

4,008,225
PROCESS FOR THE MANUFACTURE OF BIS-AZOMETHINE METAL COMPLEX COLORANTS

Francois L'Eplattenier; Laurent Vuitel, both of Therwil, and André Pugin, Riehen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

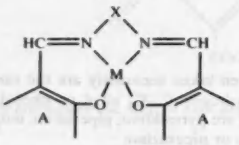
Filed July 28, 1975, Ser. No. 599,444

Claims priority, application Switzerland, July 31, 1974, 10585/74

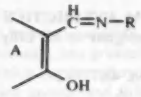
Int. Cl.² C07F *3/06, 3/08, 15/00*

U.S. Cl. 260—240 G **13 Claims**

1. Process for the manufacture of bis-azomethine metal complex colorants of the formula



wherein A denotes an isocyclic or heterocyclic aromatic radical, X denotes an isocyclic or heterocyclic aromatic radical to which the N-atoms are bonded in the o-position or peri-position, or an alkylene radical containing 2–8 C atoms, and M denotes a divalent transition metal ion, a zinc ion or cadmium ion, characterised in that an o-hydroxyaldimine compound of the formula



wherein A has the abovementioned meaning and R denotes an alkyl, cycloalkyl or aryl radical, is reacted with a diamine of the formula

$$NH_2—X—NH_2$$

wherein X has the abovementioned meaning, in the molar ratio of 2:1, in the presence of a compound which donates a divalent transition metal cation, zinc ion or cadmium ion.

4,008,226
INTERMEDIATES FOR PREPARING SEMI-SYNTHETIC CEPHALOSPORINS AND PROCESSES RELATING THERETO

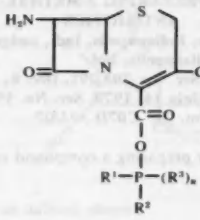
John H. Sellstedt, King of Prussia, Pa., assignor to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 217,942, Jan. 14, 1972, Pat. No. 3,962,215, which is a continuation-in-part of Ser. No. 186,397, Oct. 4, 1971, Pat. No. 3,896,110. This application July 28, 1975, Ser. No. 599,565

Int. Cl.² C07D *501/18*

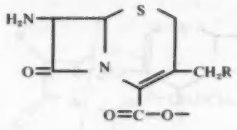
U.S. Cl. 260—243 C **14 Claims**

1. A hydrohalide salt of the formula:

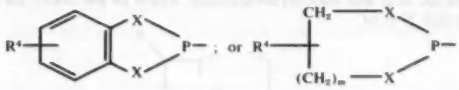


wherein:

R is selected from the class consisting of hydrogen, (lower) alkanoyloxy containing 2 to 8 carbon atoms, phenoxy, naphthoxy and a quaternary ammonium radical; R^1 and R^2 are selected from the class consisting of (lower)alkoxy, (lower)alkylthio, phenyl, naphthyl, phenoxy, naphthoxy, halo, phenylthio, phenyl(lower)alkyl, phenyl(lower)alkylthio, phenyl(lower)alkoxy, (lower)alkyl, halo(lower)alkyloxy, a radical of the formula



R^1 and R^2 when joined together form with the phosphorus atom the ring



R^3 is the oxygen atom which when present is linked by a double bond to the phosphorus atom; X is selected from the class consisting of oxygen, sulfur and methylene; R^4 is selected from the class consisting of hydrogen and (lower)alkyl; *n* is an integer from 0 to 1; *m* is an integer from 1 to 6.

4,008,227
CEPHALOSPORINS

Michihiko Ochiai, Osaka; Osami Aki, Kawanishi; Akira Morimoto, Osaka, and Taiiti Okada, Kyoto, all of Japan, assignors to Takeda Chemical Industries, Ltd., Japan

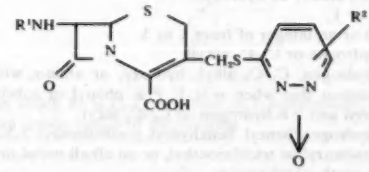
Filed June 25, 1974, Ser. No. 483,083

Claims priority, application Japan, June 25, 1973, 48-71526; Aug. 18, 1973, 48-92677

Int. Cl.² C07D *501/36*

U.S. Cl. 260—243 C **17 Claims**

1. A compound of the formula:



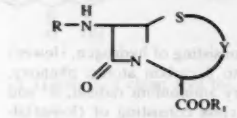
wherein R^1 represents mandeloyl or 2-(3-sydnone)-acetyl and R^2 represents hydrogen, chlorine, bromine, C_1–C_3 alkyl or C_1–C_3 alkoxy, or a pharmaceutically acceptable salt thereof.

4,008,228
PROCESS FOR PREPARING 3-METHYL-3-CEPHEM ANTIBIOTICS

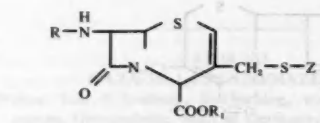
Robert R. Chauvette, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Continuation of Ser. No. 205,291, Dec. 6, 1971. This application July 14, 1975, Ser. No. 595,965
Int. Cl.[2] C07D *501/02*
U.S. Cl. 260—243 C 6 Claims

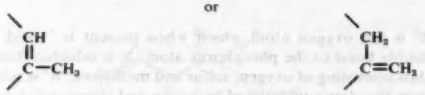
1. The method for preparing a compound of the formula



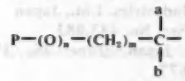
which comprises reducing in an inert solvent a 3-thiosubstituted methyl 2-cephem compound of the formula



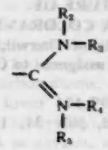
with a reducing agent selected from the group consisting of a) hydrogen in the presence of a nickel, cobalt, or palladium hydrogenation catalyst and b) metallic zinc in the presence of formic acid and dimethylformamide, where in the above formulae Y is or



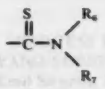
R is hydrogen, C_1–C_8 alkanoyl, benzoyl, aminoadipoyl, or a group of the formula



wherein P is α-thienyl, β-thienyl, α-furyl, β-furyl, phenyl, or substituted phenyl substituted by halogen, C_1–C_4 alkyl, C_1–C_4 alkoxy or hydroxy,
n is 0 or 1,
m is 0 or an integer of from 1 to 3
a is hydrogen or C_1–C_3 alkyl,
b is hydrogen, C_1–C_3 alkyl, hydroxy, or amino; with the limitation that when *n* is 1, P is phenyl of substituted phenyl and *b* is hydrogen or C_1–C_3 alkyl;
R_1 is hydrogen, benzyl, benzhydryl, p-nitrobenzyl, 3,5-dimethoxybenzyl or trichloroethyl, or an alkali metal or alkaline earth metal cation;
Z is C_2–C_4 alkanoyl, C_2–C_4 haloalkanoyl, benzoyl, substituted benzoyl substituted by halogen, C_1–C_4 alkyl, C_1–C_4 alkoxy or hydroxy, C_1–C_4 lower alkyl, C_1–C_{12} alkoxythionocarbonyl, an amidino group of the formula



wherein R_2, R_3, R_4 and R_5 are the same or different and represent hydrogen, C_1–C_6 alkyl, phenyl, benzyl, or phenylethyl,
a thiocarbamoyl group of the formula



wherein R_6 and R_7 when taken separately are the same or different and are hydrogen C_1–C_6 alkyl or phenyl, and when taken together are pyrrolidino, piperidino, morpholino, thiomorpholino or piperazino;
a monocyclic heteroaryl group selected from the group consisting of 2-pyridyl, 3-pyridyl, 2-pyrimidyl, 2-imidazolyl, 2-thiazolyl, 2-tetrazolyl, 1-methyl-2-tetrazolyl, 1,3,4-thiadiazolyl and 5-methyl-1,3,4-thiadiazolyl;
or a sulfo group of the formula

$$-SO_3^-M^+$$

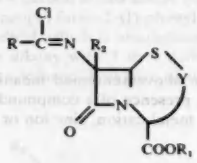
wherein M^+ is an alkali metal or alkaline earth metal cation; and when Z is said amidino group, R_1 is hydrogen, and when Z is $-SO_3^-M^+$, R_1 is M^+.

4,008,229
HALO SUBSTITUTED β-LACTAM ANTIBIOTICS

Wayne A. Spitzer, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed July 11, 1974, Ser. No. 487,702
Int. Cl.[2] C07D *501/16*
U.S. Cl. 260—243 C 4 Claims

1. A compound of the formula



wherein
R is C_2–C_7 1-alkenyl; phenyl; substituted phenyl, in which the substituent is halo, C_1–C_4 alkoxy, nitro, C_1–C_4 alkyl, or phenyl; furyl; thienyl; naphthyl; styryl; or substituted styryl, in which the substituent is halo or nitro;
R_1 is a carboxyl protecting ester forming group;
R_2 is halo;
Y is:

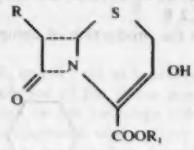
Wherein Q is methyl or acetoxymethyl.

4,008,230
PROCESS FOR PREPARING 3-HYDROXY CEPHALOSPORINS

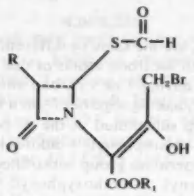
Gary A. Koppel, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Oct. 29, 1975, Ser. No. 626,684
Int. Cl.² C07D 501/02
U.S. Cl. 260—243 C 11 Claims

1. A process for preparing a 3-hydroxycephalosporin of the formula



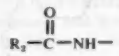
which comprises the step of reacting a compound of the formula



with mercuric acetate in an inert solvent medium, and adding a mercuric ion precipitator to the resulting reaction mixture, in which, in the above formulae, R_1 is a carboxylic acid protecting group, and R is

a. phthalimido;

b. an amido group of the formula

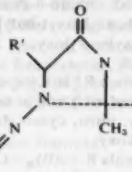


in which R_2 is

1. hydrogen, C_1—C_3 alkyl, halomethyl, thienyl-2-methyl, 4-protected-amino-4-protected carboxybutyl, benzyloxy, 4-nitrobenzyloxy, t-butyloxy, 2,2,2-trichloroethoxy, 4-methoxybenzyloxy;
2. a group of the formula R'—$(O)_m$—CH_2— in which m is 0 or 1, and R' is phenyl or phenyl substituted with 1 or 2 halogens, protected hydroxy, nitro, cyano, trifluoromethyl, C_1–C_4 alkyl, or C_1–C_2 alkoxy;
3. a group of the formula

in which R' is as defined above and W is protected hydroxy, protected carboxy, or protected amino; or

c. an imidazolidinyl group of the formula



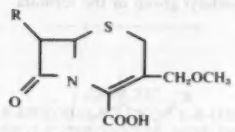
in which R' is as defined above.

4,008,231
PREPARATION OF 3-METHOXYMETHYLCEPHALOSPORINS

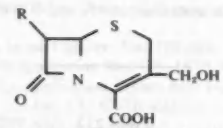
Ian G. Wright, Greenwood, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Sept. 15, 1975, Ser. No. 613,388
Int. Cl.² C07D 501/26, 501/28, 501/30
U.S. Cl. 260—243 C 9 Claims

1. A process for preparing a 3-methoxymethylcephalosporin of the formula

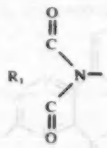


which comprises contacting a 3-hydroxymethylcephalosporin of the formula



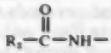
with at least four equivalents of an activating agent selected from the group consisting of trifluoracetic anhydride, phosphorus trichloride, phosphorus oxychloride, and thionyl chloride at a temperature of from about −30° to about +20° C. to produce an intermediate compound, separating the resulting intermediate from excess activating agent by treating the reaction mixture at reduced pressure and at a temperature not in excess of about 50° C., and reacting said intermediate with an excess of methanol at a temperature of from about 45° to about 75° C. to produce the aforementioned product, in any of the above in which R is

1. an imido group of the formula



in which R_1 is C_2–C_4 alkylene or 1,2-phenylene;

2. an amido group of the formula



in which R_2 is

a. hydrogen, C_1–C_3 alkyl, halomethyl, 4-amino-4-carboxybutyl, 4-protected amino-4-protected carboxybutyl, benzyloxy, 4-nitrobenzyloxy, t-butyloxy, 2,2,2-trichloroethoxy, 4-methoxybenzyloxy, 3-(2-chlorophenyl)-5-methylisoxazol-4-yl;

b. the group R′ in which R′ is 1,4-cyclohexadienyl, phenyl, or phenyl substituted with one or two halogens, hydroxy, protected hydroxy, nitro, cyano, trifluoromethyl, C_1–C_4 alkyl, or C_1–C_4 alkoxy;

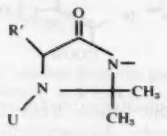
c. a group of the formula R′—$(O)_m$—CH_2— in which R′ is as defined above and *m* is 0 or 1;

d. a group of the formula

in which R″ is R′ as defined above, 2-thienyl, or 3-thienyl, and W is hydroxy, protected hydroxy, carboxy, protected carboxy, amino, or protected amino;

e. a group of the formula ‴—CH_2— in which R‴ is 2-thienyl, 3-thienyl, 2-furyl, 3-furyl, 2-thiazolyl, 5-tetrazolyl, 1-tetrazolyl, or 4-isoxazolyl; or R is

3. an imidazolidinyl group of the formula



in which R′ is as defined above and U is nitroso or acetyl.

4,008,232

3-AMINO-5,6-DIARYL-1,2,4-TRIAZINES

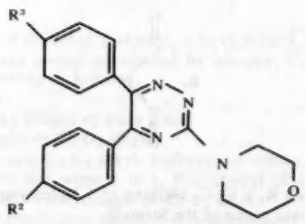
William B. Lacefield, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 589,737, June 23, 1975, Pat. No. 3,979,516, which is a division of Ser. No. 438,156, Jan. 31, 1974, Pat. No. 3,948,894. This application Apr. 12, 1976, Ser. No. 676,086

Int. Cl.² C07D *265/30*

U.S. Cl. 260—247.1 M **1 Claim**

1. The compound of the formula



wherein R^2 and R^3 are independently C_1–C_3 alkoxy, dimethylamino, fluoro or methylsulfinyl; and a pharmaceutically acceptable acid addition salt thereof; subject to the limitations that (1) when R^2 is fluoro, R^3 is C_1–C_3 alkoxy, and (2) when R^3 is fluoro, R^2 is C_1–C_3 alkoxy or dimethylamino.

4,008,233

PROCESS FOR THE PREPARATION OF 4R-AMINO-1T-PHENYL-1C-ETHOXYCARBONYL-CYCLOHEXENES-(2)

Gerhard Satzinger, Denzlingen, and Manfred Herrmann, Gundelfingen, both of Germany, assignors to Warner-Lambert Company, Morris Plains, N.J.

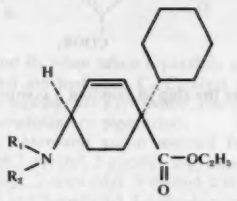
Division of Ser. No. 383,421, July 27, 1973, Pat. No. 3,905,978, which is a continuation-in-part of Ser. No. 226,509, Feb. 15, 1972, Pat. No. 3,957,851. This application Nov. 29, 1974, Ser. No. 528,107

Claims priority, application Germany, Aug. 9, 1972, 2239219

Int. Cl.² C07C *101/38;* **C07D** *295/14*

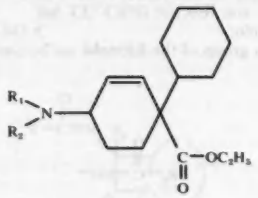
U.S. Cl. 260—247.2 B **7 Claims**

1. A process for the production of compounds of the formula:



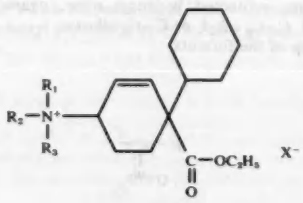
wherein R_1 and R_2 are the same or different and are hydrogen or alkyl having 1 to 4 carbon atoms or one of the two groups is allyl, phenalkyl having 7 to 9 carbon atoms or α-methyl-β-hydroxyethyl or R_1 and R_2 together form a morpholino group, a piperazino group substituted at the 4- position by methyl, benzyl, phenyl, 3-chlorophenyl, 4-chlorophenyl, 2-phenethyl or benzoyl or a piperidino group substituted at the 4-position by hydroxyl, phenyl, 2-methoxyphenyl, 4-methoxyphenyl, methyl or benzyl which comprises:

A. treating mixtures of geometrical isomers of the formula:



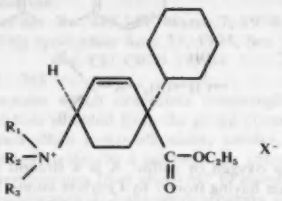
wherein R_1 and R_2 are as hereinbefore described with about 1.0 to 2.0 mols of an alkyl halide of 1 to 4 carbon atoms and an aromatic hydrocarbon solvent at about 20° to 30° C;

B. collecting of the precipitate to give mixtures of the quaternary ammonium geometric isomers of the formula:



wherein R_1 and R_2 are as hereinbefore described, R_3 is lower alkyl having 1 to 4 carbon atoms and X^- is a halide;

C. fractionally crystallizing the mixtures of the geometrical isomers of the product thus obtained from an organic solvent to give the geometric isomer of the formula:



wherein R_1, R_2, R_3 and X^- are as hereinbefore described;

D. filtering a solution of the above isomer and an organic solvent through an ion exchange column in the acetate form to give compounds of the above isomer wherein R_1, R_2 and R_3 are as hereinbefore described and X^- is acetate; and

E. heating a solution of the acetates of the product thus obtained and an acetonitrile-toluene solvent at the boiling point of the solvent.

4,008,234

PROCESS FOR THE PREPARATION OF MELON

Ferdinand Weinrotter; Karlheinz Wegleitner, both of Linz, and Walter Müller, Leonding, all of Austria, assignors to Chemie Linz Aktiengesellschaft, Linz, Austria

Filed Aug. 1, 1975, Ser. No. 601,135

Claims priority, application Austria, Aug. 7, 1974, 6469/74

Int. Cl.² C07D *251/72*

U.S. Cl. 260—249.6 **16 Claims**

1. A process for the preparation of melon which comprises heating solid, formed mixtures of at least two compounds selected from the group consisting of dicyandiamide, melamine, urea, biuret, triuret and guanidine carbonate at a temperature from 450° to 600° C, whereby these mixtures must contain at least one compound selected from the group consisting of dicyandiamide and melamine.

4,008,235

N-[2-(PYRIDINYL)-4-PYRIMIDINYL]UREAS

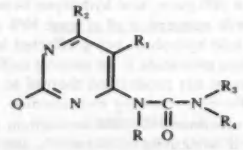
George Y. Lesher, Rensselaer, and Baldev Singh, East Greenbush, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Filed Mar. 7, 1975, Ser. No. 556,213

Int. Cl.² C07D *239/42*

U.S. Cl. 260—256.4 N **9 Claims**

1. A compound of the formula



where Q is 4- or 3- or 2-pyridinyl or 4- or 3- or 2-pyridinyl having one or two lower-alkyl substituents or N-oxide thereof, R is hydrogen or lower-alkyl, R_1 is hydrogen, lower-alkyl or cyano, R_2 is hydrogen or lower-alkyl, R_3 is hydrogen, lower-alkyl or lower-hydroxyalkyl, R_4 is hydrogen, lower-alkyl, lower-hydroxyalkyl, lower-alkenyl or lower-cycloalkyl; or its acid-addition salt.

4,008,236

2,4-DIAMINO-5-BENZYLPYRIMIDINES

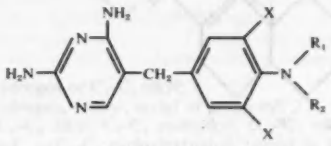
Thomas John Perun, Libertyville; Ronald Robert Rasmussen, and Bruce Wayne Horrom, both of Waukegan, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed July 31, 1975, Ser. No. 601,118

Int. Cl.² C07D *239/48*

U.S. Cl. 260—256.4 N **6 Claims**

1. A compound of the formula:



wherein R_1 is H or loweralkyl; R_2 is H, loweralkyl or R_3CO— wherein R_3 is H or alkyl of 1 to 8 carbon atoms; and X is a halogen; and the acid addition salts thereof.

4,008,237

2,3,5,8-TETRAHYDRO-5-ALKOXY-8-OXOFURO(2,3-g)QUINOLINE-7-CARBOXYLIC ACID DERIVATIVES

Hideo Agui, Toyoyaka; Iwao Nakatsuka, Nishinomiya; Toru Mitani, Kyoto; Mitsuo Nakashita, Kobe; Takenari Nakagome, Nishinomiya; Toshiaki Komatsu, Takarazuka; Akio Izawa, and Yasuko Eda, both of Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

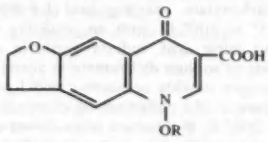
Continuation-in-part of Ser. No. 379,888, July 16, 1973, abandoned. This application Oct. 28, 1975, Ser. No. 626,001

Claims priority, application Japan, July 14, 1972, 47-71132

Int. Cl.² C07D *215/56*

U.S. Cl. 260—287 AN **2 Claims**

1. A compound of the formula:



wherein R is C_{1-C4} alkyl, and nontoxic pharmaceutically acceptable salts thereof.

4,008,238

24-METHYL-14A -AZA-D-HOMO-CHOLESTADIENE DERIVATIVES

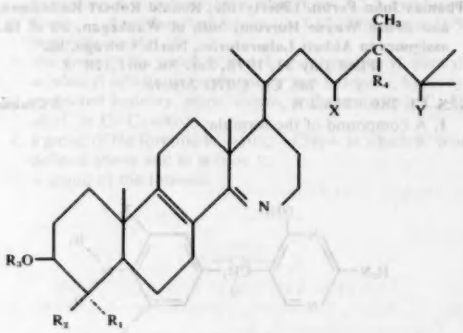
Charles D. Jones, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 503,563, Sept. 6, 1974, abandoned. This application Jan. 29, 1976, Ser. No. 653,676

Int. Cl.² C07D *215/16*

U.S. Cl. 260—289 AZ **9 Claims**

1. A compound of the formula



wherein:

R_1 and R_2 are both hydrogen or both methyl;

R_3 is hydrogen;

R_4 is halogen or hydroxyl, or when taken together with X or with Y forms a double bond;

X is hydrogen, or together with R_4 forms a double bond;

Y is hydrogen, or together with R_4 forms a double bond;

and the pharmaceutically acceptable salts thereof.

4,008,239

PREPARATION OF 4-(3-NITROPHENYL)PYRIDINE

Philip M. Carabateas, and Gordon L. Williams, both of Schodack, N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 588,380, June 19, 1975, Pat. No. 3,970,662. This application Feb. 20, 1976, Ser. No. 659,695

Int. Cl.² C07D *213/26*

U.S. Cl. 260—290 P **13 Claims**

1. The process which comprises reacting 3-nitrobenzaldehyde with two molar equivalents of di-(lower-alkyl) oxalacetate in the presence of piperidine and/or its acetate at about 25° to 40° C. to produce tetra-(lower-alkyl) 3-(3-nitrophenyl)-1,5-pentanedione-1,2,4,5-tetracarboxylate, reacting said 1,5-pentanedione with ammonia at about 30° to 120° C. to produce tetra-(lower-alkyl) 1,4-dihydro-4-(3-nitrophenyl)-2,3,5,6-pyridinetetracarboxylate, reacting said 1,4-dihydropyridine at about 25° to 100° C. with an oxidizing agent selected from aqueous nitric acid, sodium nitrite in acetic acid, chromium trioxide or sodium dichromate in acetic acid, nitrogen oxide, or nitrogen dioxide or heating said 1,4-dihydropyridine in the presence of a palladium-on-charcoal catalyst at about 100° to 200° C. to produce tetra-(lower-alkyl) 4-(3-nitrophenyl)-2,3,5,6-pyridinetetracarboxylate, hydrolyzing the latter ester either under acidic or alkaline conditions at about 25° to 100° C. to produce 4-(3-nitrophenyl)-2,3,5,6-pyridinetetracarboxylic acid and heating said pyridinetetracarboxylic acid at about 200°–250° C. to produce 4-(3-nitrophenyl)pyridine.

4,008,240

XANTHENE AND THIOXANTHENE DERIVATIVES

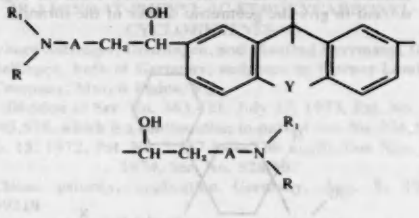
Arthur D. Sill, and Francis W. Sweet, both of Cincinnati, Ohio, assignors to Richardson-Merrell Inc., Wilton, Conn.

Filed Dec. 21, 1972, Ser. No. 317,148

Int. Cl.² C07D *409/14*

U.S. Cl. 260—293.58 **5 Claims**

1. A 2,7-bis basic alkanol derivative of xanthene and thioxanthene having the general formula:



wherein Y is oxygen or sulfur; A is a straight or branched alkylene chain having from 1 to 4 carbon atoms; R and R_1 are each selected from the group consisting of, lower alkyl having from 1 to 6 carbon atoms, cycloalkyl having from 3 to 6 carbon atoms, alkenyl having from 3 to 6 carbon atoms in which the unsaturation is in a position other than in the 1-position of the alkenyl group, and when R and R_1 are taken together with the nitrogen atom to which they are attached represent the pyrrolidinyl, morpholino or piperidino radical; and the pharmaceutically acceptable acid addition salts thereof.

4,008,241

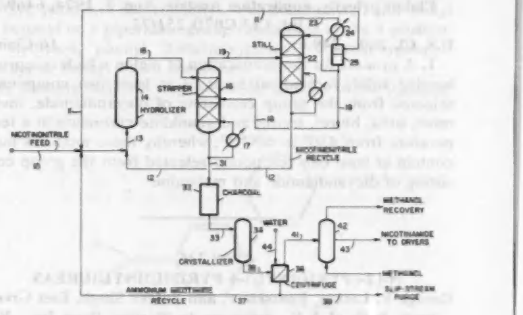
NICOTINAMIDE PRODUCTION

Abraham P. Gelbein, Plainfield; John E. Paustian, Whittany, and Morgan C. Sze, Upper Montclair, all of N.J., assignors to The Lummus Company, Bloomfield, N.J.

Filed Sept. 2, 1975, Ser. No. 609,626

Int. Cl.² C07D *213/56*

U.S. Cl. 260—295.5 A **9 Claims**



1. A continuous process for producing nicotinamide, at essentially 100% nicotinamide selectivity, comprising:

a. hydrolyzing nicotinonitrile in an aqueous ammonia solution, said hydrolysis being effected at a nicotinonitrile concentration, expressed as parts by weight of product amide per 100 parts of water, of at least 100 parts and no greater than 300 parts, said hydrolysis being effected at a nicotinonitrile conversion of at least 30% and no greater than 70%, said hydrolysis being effected in the presence of ammonium nicotinate in an amount sufficient to essentially eliminate net production thereof to produce a hydrolysis effluent containing nicotinamide, ammonia, unconverted nicotinonitrile and ammonium nicotinate at a nicotinamide selectivity of essentially 100%;

b. separating unconverted nicotinonitrile and ammonia from the hydrolysis effluent;

c. recovering nicotinamide from the hydrolysis effluent to produce solid nicotinamide and a mother liquor containing nicotinamide and ammonium nicotinate; and

d. recycling at least a portion of the mother liquor to the hydrolysis of step (a) in order to provide ammonium nicotinate.

4,008,242

PROCESS FOR THE PREPARATION OF S-TRIAZOLO[3,4-B]BENZOTHIAZOLES

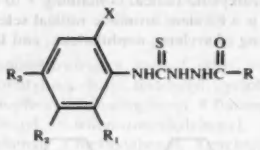
Charles J. Paget, Indianapolis, and James H. Wikel, Greenwood, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 449,141, March 7, 1974, Pat. No. 3,937,713. This application Aug. 25, 1975, Ser. No. 607,848

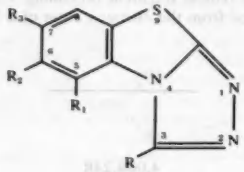
Int. Cl.² C07D *513/04*

U.S. Cl. 260—305 16 Claims

1. The process which comprises commingling a molar equivalent of base selected from the group consisting of lithium alkyls and alkali metal alkoxides, amides, carbonates, hydrides and hydroxides, in a substantially anhydrous amide solvent at a temperature from about 60° to about 200° C with a 1-acyl-4-(o-halophenyl)-3-thiosemicarbazide compound of the formula



to yield a s-triazolo[3,4-b]benzothiazole compound of the formula



wherein

R is hydrogen, C_1–C_{11} alkyl, cyclopropyl or trifluoromethyl,

R_1 is hydrogen, bromo, chloro or fluoro;

R_2 and R_3 are independently hydrogen, C_1–C_3 alkyl, C_1–C_3 alkoxy, bromo, chloro, fluoro or trifluoromethyl, with the limitation that at least one of R_2 and R_3 is hydrogen;

X is bromo, chloro or fluoro;

subject to the further limitation that when R_1 is halogen, R is other than hydrogen and R_2 is hydrogen.

4,008,243

ANTIVIRAL THIAZOLINYL OR THIAZINYL BENZIMIDAZOLE ESTERS

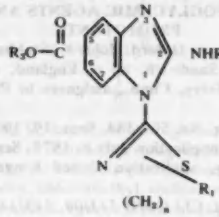
James H. Wikel, Greenwood, and Charles J. Paget, Indianapolis, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Nov. 19, 1975, Ser. No. 633,203

Int. Cl.² C07D *417/04*

U.S. Cl. 260—306.7 T 15 Claims

1. A compound of the formula



wherein

R_1 is hydrogen or C_1–C_3 alkyl;

R_2 is hydrogen, formyl, acetyl or propionyl;

R_3 is C_1–C_8 alkyl, C_3–C_7 cycloalkyl, (C_3–C_7 cycloalkyl)-methyl, 1-(C_3–C_7 cycloalkyl)ethyl, benzyl or α-methylbenzyl;

is at the 5 or 6 position; and *n* is 2or 3.

4,008,244

OXAZOLIDINE AND THIAZOLIDINE CARBODITHIOATES

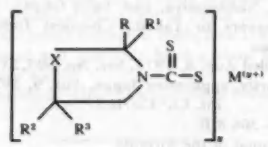
Ivan Christoff Popoff, Ambler, and Paul Gordon Haines, Lafayette Hill, both of Pa., assignors to Pennwalt Corporation, Philadelphia, Pa.

Division of Ser. No. 438,819, Feb. 1, 1974, Pat. No. 3,943,143, which is a continuation-in-part of Ser. No. 356,034, April 30, 1973, abandoned, which is a continuation-in-part of Ser. No. 259,900, June 5, 1972, abandoned, which is a continuation-in-part of Ser. No. 116,250, Feb. 17, 1971, Pat. No. 3,674,701. This application Aug. 15, 1975, Ser. No. 604,981

Int. Cl.² C07D *277/04*, *263/04*

U.S. Cl. 260—306.7 R 8 Claims

1. A compound of the structure



where X is sulfur or oxygen, R, R^1, R^2 and R^3 are independently selected from the group consisting of hydrogen, lower alkyl having from 1 to 8 carbon atoms, CCl_3, phenyl and substituted phenyl wherein there are not more than two substitutents selected from the group consisting of NR^4R^5, OH, OR^6 and Cl wherein R^4 and R^5 are independently selected from the group consisting of hydrogen and methyl, R^6 is a lower alkyl having from 1 to 8 carbon atoms, not more than one of R and R^1 is phenyl and not more than one of R^2 and R^3 is phenyl; M is selected from the group consisting of sodium, potassium, tri-(C_1–C_8) alkyl substituted ammonium and phenyl-di-(C_1–C_8) alkyl substituted ammonium; and *y* is 1.

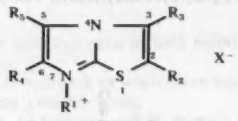
4,008,245

IMIDAZO[2,1-b]THIAZOLE AND THIAZOLO[3,2-a]-BENZIMIDAZOLE QUATERNARY SALTS AS HYPOGLYCEMIC AGENTS AND GROWTH PROMOTANTS

Richard M. Acheson, Oxford; John K. Stubbs, Deal; Charles A. R. Baxter, Sandwich, all of England, and Donald E. Kuhla, Gales Ferry, Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 507,384, Sept. 19, 1974, Pat. No. 3,954,784. This application July 8, 1975, Ser. No. 594,109
Claims priority, application United Kingdom, Sept. 20, 1973, 44199/73
Int. Cl.² C07D *513/04, 513/14*
U.S. Cl. 260—306.7 T **3 Claims**

1. A compound of the formula



wherein X is a pharmaceutically acceptable anion;
R_1 is selected from the group consisting of alkyl having from twelve to eighteen carbon atoms and allyl;
R_2 is selected from the group consisting of hydrogen and alkyl having from one to three carbon atoms;
R_3 is selected from the group consisting of hydrogen, alkyl having from one to three carbon atoms, adamantyl, phenyl and substituted phenyl wherein said substituent is selected from the group consisting of dimethyl and dimethoxy;
R_2 and R_3 when taken together are tetramethylene;
R_4 is selected from the group consisting of hydrogen, alkyl having from one to three carbon atoms, phenyl, dimethylphenyl, and chlorophenyl and
R_5 is hydrogen.

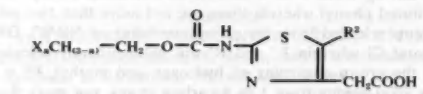
4,008,246

AMINOTHIAZOLE DERIVATIVES

Michihiko Ochiai, Suita; Akira Morimoto, Ikeda; Yoshihiro Matsushita, Nishinomiya, and Taiiti Okada, Kyoto, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Aug. 8, 1975, Ser. No. 603,237
Claims priority, application Japan, Aug. 9, 1974, 49-91810
Int. Cl.² C07D *277/48*
U.S. Cl. 260—306.8 R **6 Claims**

1. A compound of the formula



wherein X is chlorine or bromine,
n is 1, 2 or 3, and
R^2 is hydrogen, chlorine or bromine.

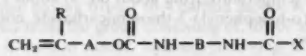
4,008,247

ETHYLENICALLY UNSATURATED BLOCKED AROMATIC DIISOCYANATES

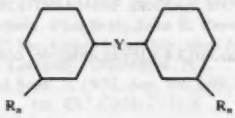
Harold A. Tucker, Shaker Heights, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Division of Ser. No. 412,325, Nov. 2, 1973, abandoned. This application Feb. 18, 1975, Ser. No. 550,627
Int. Cl.² C07D *249/18*
U.S. Cl. 260—308 B **6 Claims**

1. An ethylenically unsaturated blocked aromatic diisocyanate of the formula



wherein R is hydrogen or a methyl or ethyl radical; A is a carbonyloxyalkylene radical containing 2 to about 8 carbon atoms or an aralkylene radical containing 7 to about 12 carbon atoms; B is a bivalent aromatic radical selected from the group consisting of arylene, naphthalene, and the structure



where R is defined as above; Y is O, S, or $-(CH_2)_n$; $n = 0$ to 3; and X is the radical fragment remaining after a hydrogen atom is removed from the nitrogen atom of a benzotriazole.

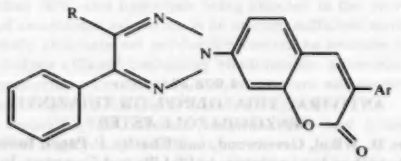
4,008,248

PROCESS FOR THE PURIFICATION OF COUMARINS

Uwe Claussen, Leverkusen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 451,559, March 15, 1974, abandoned. This application Mar. 12, 1975, Ser. No. 557,658
Claims priority, application Germany, Mar. 16, 1973, 2313030
Int. Cl.² C07D *405/10, 405/14*
U.S. Cl. 260—308 A **6 Claims**

1. The compound in the β-modification and having the formula



wherein
R represents hydrogen or C_1–C_4-alkyl and
Ar represents phenyl, pyrazolyl, 4-chloropyrazolyl, 1,2,4-triazolyl or imidazolyl.

4,008,249
SUBSTITUTED PYRAZOLES

Adolf Fischer, deceased, late of Mutterstadt, Germany (by Caecilia Emma Fischer, heiress-at-law); Rudolf Kropp, Limburgerhof, Germany, and Franz Reicheneder, deceased, late of Ludwigshafen, Germany (by Dora Irmgard Reicheneder, heiress-at-law), assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

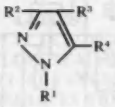
Filed Feb. 27, 1975, Ser. No. 553,496

Claims priority, application Germany, Mar. 1, 1974, 2409775

Int. Cl.² C07D *231/18;* **A01N** *9/22*

U.S. Cl. 260—310 R **9 Claims**

1. A substituted pyrazole of the formula:



in which R^1 denotes hydrogen, methyl, ethyl, propyl, isopropyl, n-butyl, isobutyl, sec-butyl, tert-butyl, cyclohexyl, benzyl, phenyl, 2-chlorophenyl, 2-fluorophenyl, 4-fluorophenyl, 3-trifluoromethylphenyl, 4-trifluoromethylphenyl, 4-chlorophenyl, 4-bromophenyl, 3-methylphenyl, 4-mehtylphenyl, 3,4-dichlorophenyl, 3,5-dichlorophenyl, 2-methyl-4-chloro phenyl, or 3-chloro-4-methoxphenyl, or R^1 denotes $-COR^6$ in which R^6 denotes hydrogen, methyl, ethyl, propyl, isopropyl, chloromethyl, dibromoethyl, trichloromethyl, 4-chlorophenoxymethyl, 2,4-dichlorophenoxymehtyl, 2,4,5-trichlorophenoxymethyl, 2-methyl-4-chlorophenoxymethyl, 2,4-dichlorophenoxypropyl, methoxy, ethoxy or phenoxy; or R^1 denotes

wherein R^7 and R^8 are identical or different and each denotes hydrogen, methyl, ethyl, propyl, isopropyl, isobutynyl, phenyl, 3-chlorophenyl, 2,4-dimethylphenyl, 4-fluorophenyl, 3-trifluoromethylphenyl, 4-trifluoromethylphenyl, 2,4-dichlorophenyl, 3,4-dichlorophenyl, 3,5-dichlorophenyl and 3-chloro-4-methoxyphenyl;

R^2 denotes phenyl, 2-chlorophenyl, 2-fluorophenyl, 4-bromophenyl, 4-fluorophenyl, 2,4-dichlorophenyl, 2,6-dichlorophenyl, 3,5-dichlorophenyl, 2-methyl-4-chlorophenyl, 3-methylphenyl, 2,4-dimethylphenyl, 3,5-dimethylphenyl, or 3-chloro-4-methoxyphenyl; R^3 denotes hydrogen, chloro, bromo, methyl, ethyl, propyl or isopropyl; and

R^4 denotes $-S-R^5$, in which R^5 denotes phenyl.

4,008,250
CYCLOPENTA[c]PYRROLE DERIVATIVES

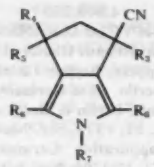
Malcolm R. Bell, and Rudolf Oesterlin, both of East Greenbush, N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Continuation-in-part of Ser. No. 346,005, March 29, 1973, Pat. No. 3,928,380. This application Mar. 17, 1975, Ser. No. 558,807

Int. Cl.² C07D *309/52*

U.S. Cl. 260—326.27 **38 Claims**

1. A compound having the formula



where each of R_3, R_4 and R_5 is hydrogen or methyl; each R_6 group is the same or different hydrogen, formyl, and lower-alkane-1,3-diol ketals thereof, phenyl-lower-alkyl, carboxy, carbo-lower-alkoxy, chloromethyl, dichloromethyl, trichloromethyl, hydroxymethyl, hydroxycyanomethyl or lower-alkyl; and R_7 is hydrogen, lower-alkyl, halo-lower-alkyl, lower-alkenyl, lower-alkynyl, lower-alkoxy-lower-alkyl, hydroxy-lower-alkyl, lower-alkylthio-lower-alkyl, cycloalkyl, cycloalkyl-lower-alkyl, phenyl, phenyl-lower-alkyl, cyano-lower-alkyl, or divalent-lower-alkylene having its valences on different carbon atoms and joining two of the 2,4,5,6-tetrahydrocyclopenta-[c]pyrrole moieties together, and wherein the phenyl or phenyl-lower-alkyl groups can be further substituted in the phenyl nucleus by a single methylenedioxy or by from one to three members of the group consisting of lower-alkyl, lower-alkoxy, halogen, hydroxy, trifluoromethyl, lower-alkanoylamino, amino, di-lower-alkylamino, carboxyl, carboxamido, carbo-lower-alkoxy, lower-alkylmercapto, lower-alkylsulfinyl, lower-alkylsulfonyl, nitro and sulfamoyl.

4,008,251
REACTION OF ALKYLADAMANTANE COMPOUNDS TO FORM PRODUCTS HAVING TWO LINKED ADAMANTANE NUCLEI

Robert E. Moore, Wilmington, Del., and Abraham Schneider, Overbrook Hills, Pa., assignors to Sun Oil Company, (Sun Research and Development Co.), Marcus Hook, Pa.

Continuation-in-part of Ser. No. 851,488, Aug. 19, 1969, abandoned. This application July 20, 1970, Ser. No. 56,680

Int. Cl.² C07D *313/14, 311/80;* **C07C** *13/54;* ,

U.S. Cl. 260—333 **24 Claims**

1. Method of reacting an alkyladamantane compound containing only methyl as the alkyl substituents to form a hydrocarbon dimer having two adamantane nuclei linked through a methylene radical which comprises:

A. contacting a mixture consisting essentially of

1. sulfuric acid having a strength of 94–102% H_2SO_4, and
2. one or more compounds selected from the group consisting of methyl-substituted adamantanes and adamantanols having 2–3 methyl substituents, at a reaction temperature above the freezing point of said acid but below 100° C., the time of contacting and said acid strength being sufficient to result in substantial linkage to form hydrocarbon dimer in which the adamantane nuclei are inked through a methylene radical between bridgehead and nonbridgehead carbon atoms of the respective nuclei,

B. and recovering said hydrocarbon dimer from the reaction mixture.

4,008,252
SUBSTITUTED-3-FORMYLCHROMONE DERIVATIVES

Sylvester Klutchko, Hackettstown, N.J.; Daniel Kaminsky, deceased, late of Parsippany, N.J. (by Bernice R. Kaminsky, administratrix), and Maximilian von Strandtmann, Rockaway, N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 480,983, June 19, 1974, abandoned, which is a continuation-in-part of Ser. No. 352,149, April 18, 1973, abandoned. This application Dec. 8, 1975, Ser. No. 638,256

Int. Cl.² C07D *317/44*

U.S. Cl. 260—340.5 **2 Claims**

1. 3-Formyl-6,7-methylenedioxychromone.

4,008,253

BICYCLOALKANES

Gerhard Sauer, Berlin; Helmut Hauser, Unna; Gregor Haffer, Berlin; Jurgen Ruppert, Berlin; Ulrich Eder, Berlin, and Rudolf Wiechert, Berlin, all of Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

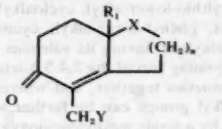
Filed Dec. 22, 1972, Ser. No. 317,549

Claims priority, application Germany, Dec. 24, 1971, 2165320; Apr. 29, 1972, 2221704; Nov. 2, 1972, 2254175

Int. Cl.² C07D *319/12*; A01N *9/28*

U.S. Cl. 260—340.7 11 Claims

1. A bicycloalkane derivative of the formula



wherein *n* is 1 or 2, R_1 is alkyl of 1–4 carbon atoms, X is alkylenedioxy-methylene of 1–10 carbon atoms and Y is —S—R_2, —SO_m—R_2 or

where *m* is 1 or 2, R_2 is alkyl, aryl or aralkyl of 1–12 carbon atoms, R_3 is hydrogen or alkyl of 1–4 carbon atoms, R_4 is alkoxycarbonyl of 2–11 carbon atoms, acyl of 2–16 carbon atoms, phenyl or phenyl substituted by alkoxy of 1–4 carbon atoms, benzyloxy or acyloxy of 2 to 8 carbon atoms, Z is nitro, alkoxycarbonyl of 1–4 carbon atoms, alkanoyl of 2–4 carbon atoms, alkysulfinyl of 1–4 carbon atoms or alkysulfonyl of 1–4 carbon atoms.

4,008,254

CERIA CATALYZED CONVERSION OF PHENOLS TO DIBENZOFURANS IN THE PRESENCE OF WATER VAPOR

David E. Gross, St. Charles, and Norman A. Fishel, Olivette, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Aug. 8, 1975, Ser. No. 603,063

Int. Cl.² C07D *307/91*

U.S. Cl. 260—346.2 M 15 Claims

1. Process for the production of a dibenzofuran compound which comprises contacting a phenolic compound feedstock comprising a phenol having an unsubstituted ortho position selected from phenols and polycyclic phenols having no substituents other than alkyl, hydroxy, aryl, aralkyl and alkaryl in the vapor phase in combination with water vapor at a temperature of 300° to 700° C at a gas hourly space velocity of from 1 hr^{-1} to 2,000 hr^{-1} with a catalyst essentially composed of a member of the class of ceria and combinations of ceria with an oxide of a metal of the group consisting of aluminum, silicon, titanium, zirconium, hafnium, magnesium, calcium, potassium, sodium, lanthanum, neodymium, praseodymium, samarium, thorium, and uranium and mixtures thereof.

4,008,255

RECOVERY OF PHTHALIC ANHYDRIDE

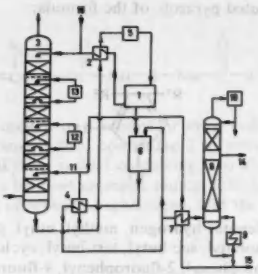
Friedrich Wirth; Wolfgang Kube; Paul Hornberger; Otto Leman; Joachim Wagner, all of Ludwigshafen, and Dieter Karau, Oftersheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Continuation of Ser. No. 451,135, March 14, 1974, abandoned. This application June 23, 1975, Ser. No. 589,566

Claims priority, application Germany, Mar. 17, 1973, 2313306

Int. Cl.² C07D *307/89*

U.S. Cl. 260—346.4 6 Claims



1. A process for the continous recovery of phthalic anhydride from process gases obtained in the catalytic atmospheric oxidation of o-xylene or naphthalene which comprises: washing said process gases in an absorption column at a temperature of 60° to 170° C with a solvent consisting essentially of C26–44 paraffins or with a hydrocarbon mixture having a boiling point of at least 360° C at atmospheric pressure and containing at least 55% by weight of C26–44 paraffins, whereby phthalic anhydride from said process gases is dissolved in said paraffins; cooling said paraffins ladened with phthalic anhydride to form solid phthalic anhydride, separating said solid phthalic anhydride from the major portion of the solvent by mechanical means to form a slurry of phthalic anhydride crystals, melting said crystals and distilling said phthalic anhydride from said slurry; and recycling said paraffins to said absorption column.

4,008,256

ESTERIFICATION OF FURFURYL ALCOHOL AND ITS DERIVATES

Ilkka Renvall, Suomenoja, and Tapio Mattila, Kivenlahti, both of Finland, assignors to Kemira Oy, Finland

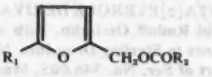
Filed Aug. 7, 1975, Ser. No. 602,550

Claims priority, application Finland, Aug. 15, 1974, 2424/74

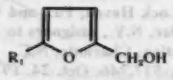
Int. Cl.² C07D *307/46*

U.S. Cl. 260—347.4 7 Claims

1. A method for producing an ester of a furfuryl alcohol of formula



wherein R_1 is hydrogen, a nitro group, a halogen atom or an alkyl group with 1–3 carbon atoms, and R_2 is alkyl or alkyl substituted by an halogen atom which comprises reacting a furfuryl alcohol of formula



II

wherein R_1 is as in Formula I, in the absence of a solvent with a lower alkanoic acid anhydride of formula $R_2COOCOR_2$ in which R_2 is as defined hereinabove in the proportion of 1 mole of said furfuryl alcohol with 1–1.2 mole of said lower alkanoic acid anhydride and catalysing the reaction with 0.05–0.5 mole of an aliphatic tertiary amine.

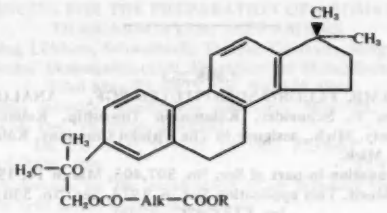
4,008,257

2,2-DIMETHYL-2-[(7,15,16,17-TETRAHYDRO-17,17-DIMETHYL-6H-CYCLOPENTA[a]PHENANTHREN-3-YL)OXY]ETHYL ALKANEDIOATES AND INTERMEDIATES THERETO

John H. Dygos, Northbrook, and Karlene W. Salamon, Chicago, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed Mar. 10, 1976, Ser. No. 665,362
Int. Cl.² C07J 9/00
U.S. Cl. 260—397.1 **6 Claims**

1. A compound of the formula



wherein Alk represents 1,2-ethanediyl or 1,3-propanediyl and R represents hydrogen or alkyl containing fewer than 8 carbons.

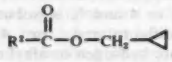
4,008,258

CYCLOPROPYL METHYL ESTERS

Clive A. Henrick, and Gerardus B. Staal, both of Palo Alto, Calif., assignors to Zoecon Corporation, Palo Alto, Calif.

Division of Ser. No. 350,708, April 13, 1973, Pat. No. 3,923,871, which is a continuation-in-part of Ser. No. 263,902, June 19, 1972, abandoned, which is a continuation-in-part of Ser. No. 255,368, May 22, 1972, abandoned. This application June 30, 1975, Ser. No. 591,689
Int. Cl.² C09F 5/08, 7/10
U.S. Cl. 260—410 **14 Claims**

1. A compound of the formula:



wherein, R^2 is alkyl of 10 to 22 carbon atoms; alkenyl of 10 to 22 carbon atoms; or alkynyl of 10 to 22 carbon atoms, said alkyl, alkenyl, or alkynyl optionally having one or two substituents selected from alkoxy of one to four carbon atoms.

4,008,259

DOUBLE SALTS COPPER ALKYLPHENOLSULFONATE AND BASIC CALCIUM AND METHOD OF PREPARATION

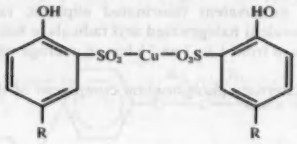
Toyozo Yonezawa, Kyoto, Japan, assignor to Yonezawa Chemical Ind. Co., Ltd., Kyoto, Japan

Filed Aug. 19, 1975, Ser. No. 605,923
Int. Cl.² C07F 1/08
U.S. Cl. 260—438.1 **3 Claims**

1. A compound of the formula

$$[Cu(APS)_2]_x[Cu(OH)_2]_a[Ca)OH)_2]_z$$

wherein $Cu(APS)_2$ represents



where

R is alkyl of 4 to 12 carbon atoms,

the ratio of Y:X being 0.3–0.6:1, and

the ratio of Z:X being 0.05–0.8:1.

2. A method for the preparation of a double salt of copper alkylphenolsulfonate and basic calcium which comprises reacting an aqueous or methanol solution of copper alkylphenolsulfonate having at the para position an alkyl group of from 4 to 12 carbon atoms and at the ortho position the sulfonic acid group, said solution having a concentration of about 30%, with an aqueous suspension of calcium hydroxide and isolating the thus produced double salt.

4,008,260

PROCESS FOR PREPARING COBALT(III)ACETYLACETONATE

Gerhard Künstle, Raitenhaslach, and Herbert Siegl, Haiming, both of Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed Mar. 24, 1975, Ser. No. 561,463
Claims priority, application Germany, Apr. 29, 1974, 2420691
Int. Cl.² C07F 15/06
U.S. Cl. 260—439 R **5 Claims**

1. A process for the preparation of cobalt (III) acetylacetonate having a black fine crystalline structure and a water content of less than 0.05% by weight, comprising the steps of:

a. dissolving cobalt (II) acetylacetonate in an organic solvent;

b. adding to the solution at a temperature between about 20° and about 60° C at least the stoichiometric amount of acetylacetone to provide an additional mol thereof;

c. adding aqueous 25% to 35% hydrogen peroxide solution in an excess amount of 1.5 to 2.5 mols, with stirring, at a temperature between about 20° and 100° C until oxidation is complete; and

d. boiling off excess hydrogen peroxide, cooling the solution, and recovering the precipitated solid cobalt(III)acetylacetonate therefrom.

4,008,261

METHOD OF PREPARING PHOSPHONIUM SILOXANES AND PRODUCTS THEREOF

Eric D. Brown, and Roger G. Chaffee, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Jan. 2, 1975, Ser. No. 537,877
Int. Cl.² C07F 7/18
U.S. Cl. 260—448.2 E **16 Claims**

1. A method of preparing a catalyst suitable for polymerizing polyorganosiloxanes which comprises

a. mixing

2. a benzene-soluble organosilicon compound of the average unit formula

where R is a radical of 1 to 18 carbon atoms selected from the group consisting of monovalent hydrocarbon radicals, monovalent fluorinated aliphatic radicals and monovalent halogenated aryl radicals, *a* has an average value of from 1 to 3 and *b* has an average value of from 0 to 1,

2. a quaternary phosphonium compound of the formula

where each R' is a monovalent hydrocarbon radical of 1 to 18 carbon atoms free of aliphatic unsaturation and X is chlorine, bromine, or iodine,

3. a basic compound of the formula MOH where M is an alkali metal and

4. water in at least sufficient quantity to dissolve the basic compound (3), wherein the quaternary phosphonium compound is present in an amount equal to from 0.03 moles to 1.5 moles for each 1,000 grams of the organosilicon compound and the basic compound is present in an amount equal to from 90% to 110% by moles, based on the number of moles of the quaternary phosphonium compound,

b. removing substantially all of the water from the mixture of (a) at a temperature of from at least 30° to about 100° C., and

c. recovering the remainder of the mixture as an anhydrous phosphorous containing organo-Silicon catalyst, containing an insoluble, non-catalytic, by-produced salt, MX, where M and X are as defined above.

2. The method of claim **1** wherein the by-produced salt, MX, is removed from said anhydrous phosphorous containing organo-Silicon catalyst and the remainder is recovered as a homogeneous anhydrous catalyst.

9. A catalyst produced by the method of claim **2.**

10. A method of increasing the molecular weight of a polyorganosiloxane which comprises

A. mixing,

i. a benzene-soluble polyorganosiloxane of the average unit formula

wherein R is a radical of 1 to 18 carbon atoms selected from the group consisting of monovalent hydrocarbon radicals, monovalent fluorinated aliphatic radicals and monovalent halogenated aryl radicals, *c* has an average value of from zero to 1.0 and *d* has an average value of from 1.0 to less than 3.0. with

ii. a catalytic amount of the catalyst produced by the method of claim **2,** and

B. heating the mixture from (A) at a temperature in the range from at least 30° C. to less than 130° C. and removing substantially all of any water from said mixture until an increase in molecular weight of said polyorganosiloxane is effected.

4,008,262

α-(N-ALKYL-4-FORMYLANILINO)-TOLUENESULFONAMIDES

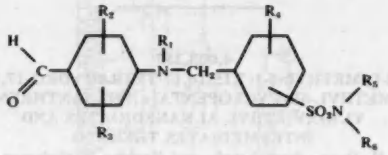
Edgar Earl Renfrew, Lock Haven, Pa., and Guido Ruggiero Lorenzo Genta, Snyder, N.Y., assignors to American Color & Chemical Corporation, Charlotte, N.C.

Division of Ser. No. 517,746, Oct. 24, 1974, Pat. No. 3,954,830, which is a division of Ser. No. 248,483, April 28, 1972, Pat. No. 3,858,254. This application Feb. 12, 1976, Ser. No. 657,639

Int. Cl.² C07C *121/78, 121/80, 143/78*

U.S. Cl. 260—465 E **1 Claim**

1. A dye intermediate of the formula:



wherein R_1 is a member selected from the group consisting of lower alkyl, hydroxy lower alkyl and cyano lower alkyl; R_2, R_3 and R_4 are members selected from the group consisting of hydrogen, lower alkyl, lower alkoxy, chlorine and bromine, and R_5 and R_6 are members selected from the group consisting of hydrogen, lower alkyl, cyano lower alkyl and hydroxy lower alkyl.

4,008,263

RACEMIC FLUORO-SUBSTITUTED PGF_2 ANALOGS

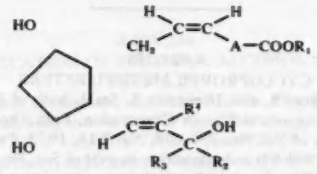
William P. Schneider, Kalamazoo Township, Kalamazoo County, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 807,405, March 14, 1969, abandoned. This application Dec. 6, 1974, Ser. No. 530,413

Int. Cl.² C07C *177/00*

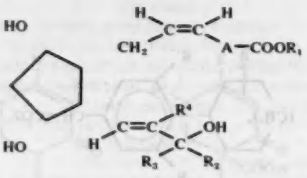
U.S. Cl. 260—468 D **17 Claims**

1. A racemic compound of the combination of the formula:



wherein the side-chain hydroxy is in S configuration, and the mirror image of that formula; wherein R_1 is hydrogen, alkyl of one to 8 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one to 3 chloro or alkyl of one to 4 carbon atoms, inclusive; wherein R_2 is $-(CH_2)_a-CH_3$ wherein *a* is 2, 3, 4, 5, or 6, or $-(CH_2)_d-X$ wherein *d* is zero, one, 2, 3, or 4 and X is isobutyl, tert-butyl, 3,3-difluorobutyl, 4,4-difluorobutyl, or 4,4,4-trifluorobutyl; wherein R_3 and R_4 are hydrogen or alkyl of one to 4 carbon atoms, inclusive; wherein A is $-CH_2-Z-$ wherein Z is ethylene substituted with one or 2 fluoro; and pharmacologically acceptable salts thereof when R_1 is hydrogen.

11. A racemic compound of the combination of the formula:



wherein the side-chain hydroxy is in S configuration, and the mirror image of that formula; wherein R_1 is hydrogen, alkyl of one to 8 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one to 3 chloro or alkyl of one to 4 carbon atoms, inclusive; wherein R_2 is $-(CH_2)_d-X$ wherein *d* is zero, one, 2, 3, or 4 and X is 3,3-difluorobutyl, 4,4-difluorobutyl, or 4,4,4-trifluorobutyl; wherein R_3 and R_4 are hydrogen or alkyl of one to 4 carbon atoms, inclusive; wherein A is trimethylene or $-CH_2-Z-$ wherein Z is ethylene substituted with one or 2 fluoro, methyl, or ethyl; and pharmacologically acceptable salts thereof when R_1 is hydrogen.

4,008,264

PROCESS FOR THE PREPARATION OF AROMATIC THIOCARBOXYLIC ACID AMIDES

Henning Lübbers, Schwalbach, Taunus, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed May 23, 1975, Ser. No. 580,484

Claims priority, application Germany, May 25, 1974, 2425414; Dec. 10, 1974, 2458282

Int. Cl.² C07C *149/40, 153/063, 153/067*

U.S. Cl. 260—470 **12 Claims**

1. A process for the preparation of an aromatic thiocarboxylic acid amide having the formula

(I)

wherein Ar is an unsubstituted aromatic hydrocarbon, or an aromatic hydrocarbon substituted by substituent groups which are substantially inert under the process conditions, said process comprising reacting a compound of the formula

Ar—H (II),

wherein Ar is as defined above, with hydrogen thiocyanate, or an inorganic metal salt or ammonium salt of thiocyanic acid and carrying out the reaction in at least 90 weight percent hydrofluoric acid, wherein the hydrogen thiocyanate or said salt of thiocyanic acid is added to the hydrofluoric acid at a temperature of about −70° to 0° C, the aromatic hydrocarbon compound II is added and the reaction mixture temperature is subsequently gradually increased to a temperature of from about 0° to 120° C.

4,008,265

NOVEL BISPHENOXY CARBOXYLIC ACID DERIVATIVES AND THEIR SALTS

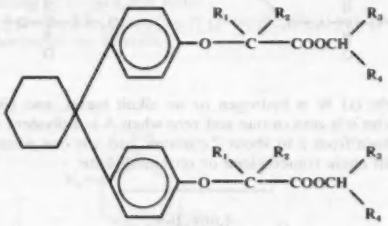
Yoshio Suzuki, Itami; Masayoshi Minai, Minoo; Noritaka Hamma, Ibaragi; Eiichi Murayama, Takarazuka, and Shunji Aono, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation of Ser. No. 255,244, May 19, 1972, abandoned. This application July 23, 1974, Ser. No. 491,033

Int. Cl.² C07C *69/66*

U.S. Cl. 260—473 G **5 Claims**

1. A bisphenoxy carboxylic acid derivative represented by the general formula,



wherein R_1 and R_2 represent lower alkyl groups, R_3 is hydrogen and R_4 represents an amino-lower-alkyl group or an N-lower-alkylaminoalkyl group and its acid addition salt.

4,008,266

COUPLING OF AROMATIC COMPOUNDS IN THE PRESENCE OF MOLECULAR OXYGEN, A MERCURIC OXYANION COMPOUND, AND A GROUP VIII METAL OR GROUP VIII METAL OXYANION COMPOUND

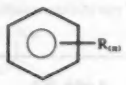
George M. Intille, Maryland Heights, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 302,713, Oct. 18, 1973, abandoned. This application Jan. 2, 1974, Ser. No. 430,280

Int. Cl.² C07C *69/76*

U.S. Cl. 260—475 R **30 Claims**

1. A catalytic process for coupling aromatic compounds of the formula



where

n is an integer from 0 to 5 and each of the R groups is hydroxy, alkoxy, alkyl, aryloxy, aryl, acyl, alkanoate, carboxyl, carboxylic esters, halogen or nitro, and where two R groups, located on adjacent carbon atoms of the benzene ring, can be joined to form a carbocyclic or heterocyclic ring

with molecular oxygen to produce coupled aromatic compounds comprising coupling said aromatic compounds with at least about 200 psi molecular oxygen in the presence of a mercuric oxyanion compound and a Group VIII metal or Group VIII metal oxyanion compound.

4,008,267

3,3'-DI(SULFONYLOXY-GROUP-CONTAINING)SUBSTITUTED BENZIDINE DERIVATIVES

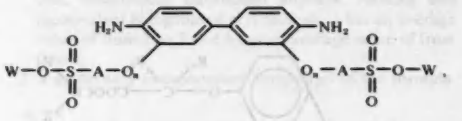
Nils Ake Jönsson, Solna; Ferenc Merényl, and Lars-Erik Westlund, both of Taby, all of Sweden, assignors to AB Kabi, Stockholm, Sweden

Continuation-in-part of Ser. No. 118,531, Feb. 24, 1971, Pat. No. 3,859,341. This application Oct. 16, 1974, Ser. No. 515,195

Int. Cl.² C07C *143/64, 143/56*

U.S. Cl. 260—509 **12 Claims**

1. A 3,3'-disubstituted benzidine derivative having the general formula



wherein (i) W is hydrogen or an alkali metal, and (ii) the subscript n is zero or one and zero when A is a divalent alkylene chain from 2 to about 7 carbons, and n is one when A is straight chain trimethylene or tetramethylene.

4,008,268

PROCESS FOR ISOMERIZATION OF A CYCLOPROPANECARBOXYLIC ACID

Toshio Mizutani, Toyonaka; Nobushige Itaya, Nishinomiya; Toshiko Nishijima, Yokohama, and Osamu Magara, Osaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

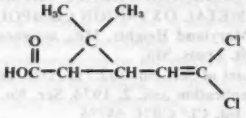
Filed June 10, 1975, Ser. No. 585,592

Claims priority, application Japan, June 15, 1974, 49-68282

Int. Cl.² C07C *61/18*

U.S. Cl. 260—514 H **6 Claims**

1. A process for isomerizing 2-(β,β-dichlorovinyl)-3,3-dimethylcyclopropanecarboxylic acid represented by the formula



(I)

from the cis to the trans form, which comprises heating the acid of the formula (I) in the presence of anhydride of the acid or a reagent producing the acid anhydride in the reaction system selected from the group consisting of acetic anhydride and thionyl chloride, wherein the reaction is carried out in the presence of a catalytic amount of a Lewis acid selected from the group consisting of paratoluenesulfonic acid and sulfuric acid.

4,008,269

PHENYLACETIC ACIDS

Julius Diamond, Lafayette Hill, and Norman Julian Santora, Roslyn, both of Pa., assignors to William H. Rorer, Inc., Fort Washington, Pa.

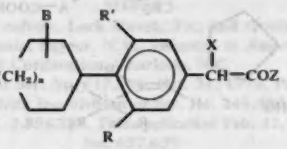
Division of Ser. No. 152,387, June 11, 1971, which is a continuation-in-part of Ser. Nos. 34,870, May 5, 1970, Pat. No. 3,864,384, and Ser. No. 152,387, June 11, 1971, Pat. No. 3,852,323. This application Dec. 10, 1973, Ser. No. 423,444

The portion of the term of this patent subsequent to Dec. 3, 1991, has been disclaimed.

Int. Cl.² C07C *63/33, 69/76*

U.S. Cl. 260—515 A **9 Claims**

1. A compound of the formula



where:

n is
0–2;

B is
hydrogen or
loweralkyl;

R is
hydroxy,
loweralkoxy,
acetyloxy,
acetyl or
loweralkyl;

R' is
hydrogen,
fluoro,
chloro,
bromo,
trifluoromethyl or
nitro;

X is
halo;

Z is
—OH,
loweralkoxy,
arloweralkoxy, or
—OM where M is an alkali, alkaline earth or aluminum metal or an ammonium salt.

4,008,270

PROCESS FOR PREPARING 2-(SUBSTITUTED PHENYL)PROPIONIC ACIDS

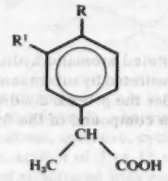
David R. White, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Oct. 14, 1975, Ser. No. 622,130

Int. Cl.² C07C *63/04*

U.S. Cl. 260—515 R **10 Claims**

1. Process for preparing a 2-(substituted phenyl)propionic acid of the formula

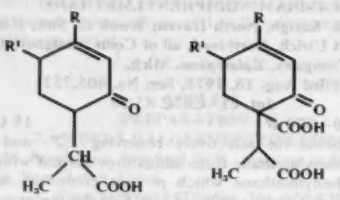


(IV)

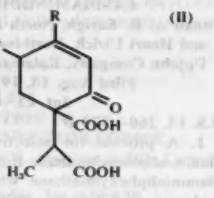
wherein R is phenyl or C_1 to C_6-alkyl and R^1 is hydrogen or fluoro, which comprises

(a) forming a mixture containing a dehydrating agent which is stable at the heating temperature and is selected from the group consisting of di(C_1 to C_6-alkyl)carbodiimides, diphenylcarbodiimide, di-p-tolylcarbodiimide, dicyclohexylcarbodiimide, florisil, phenylisocyanate and organic acid anhydrides and at least one compound having a formula selected from the group consisting of

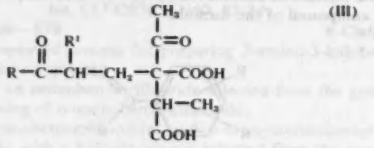
(I)



(II)



(III)



wherein R and R¹ are as defined above

b. heating the mixture from step (a) to from about 150° C. to below the decomposition point of the formula IV acid until aromatization has occurred, and (c) recovering the 2-(substituted phenyl)propionic acids from the resulting mixture.

4,008,271

PROCESS FOR PREPARING A MIXED ANHYDRIDE OF A SULFONIC ACID AND A CARBOXYLIC ACID

Karl E. Wiegand, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Division of Ser. No. 451,817, March 18, 1974, Pat. No. 3,935,216. This application June 23, 1975, Ser. No. 589,090

Int. Cl.² C07C *51/54, 153/00, 154/00*

U.S. Cl. 260—545 R **8 Claims**

1. A process for preparing a mixed anhydride of a sulfonic acid and a carboxylic acid which comprises reacting a sulfonic acid selected from the group consisting of methane sulfonic acid and toluene sulfonic acid with the anhydride of a carboxylic acid selected from the group consisting of benzoic acid, mono-substituted benzoic acid and poly-substituted benzoic acid wherein the substituent groups are selected from the group consisting of halo, lower alkyl, trifluoromethyl, lower alkoxy, nitro, amino, cyano and methylthio in the presence of a solvent selected from the group consisting of halogenated hydrocarbons and nitroalkanes, separating the free by-product carboxylic acid formed and recovering the mixed anhydride from the solvent phase.

4,008,272

N-THIOUREIDO AND N-UREIDO PHENYLENE DIAMINES AND METHOD OF PREPARING SAME

Gregoire Kalopissis; Jean Gascon, both of Paris; Andree Bugaut, Boulogne sur Seine; Jacqueline Gallien, La Garenne-Colombes, and Hubert Gaston-Breton, Paris, all of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

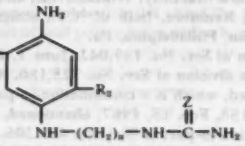
Continuation of Ser. No. 247,892, April 26, 1972, abandoned, which is a division of Ser. No. 854,784, Sept. 2, 1969, Pat. No. 3,697,215. This application May 16, 1975, Ser. No. 578,318

Claims priority, application Luxembourg, Sept. 9, 1968, 56846; Jan. 16, 1969, 57792

Int. Cl.² C07C *85/102, 87/52*

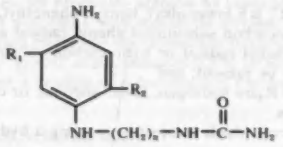
U.S. Cl. 260—552 R **12 Claims**

1. A compound for dyeing keratinic fibers and in particular human hair having the formula:

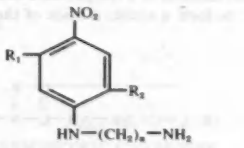


wherein R_1 and R_2 each independently are selected from the group consisting of hydrogen, halogen, alkyl having 1–3 carbon atoms and alkoxy having 1–3 carbon atoms, *n* is a whole number ranging between 2 and 4 Z is selected from the group consisting of oxygen and sulfur.

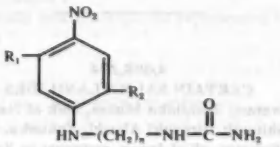
7. A method for preparing N-(β-ureido alkyl) paraphenylenediamine of the formula



wherein R_1 and R_2 each independently are selected from the group consisting of hydrogen, halogen, alkyl having 1–3 carbon atoms and alkoxy having 1–3 carbon atoms and n is a whole number between 2–4 inclusive comprising (a) reacting alkaline isocyanate with a member selected from the group consisting of the monohalogenohydrate and monoacetate of a compound of the formula



wherein R_1, R_2 and n have the meaning given above in an aqueous medium to produce a compound of the formula



wherein R_1 and R_2 have the meaning given above, (b) recovering the compound from step (a), (c) adding to the compound recovered from (b) methanol and as a reducing agent, hydrazine hydrate, and a Raney nickel catalyst, (d) heating the resulting mixture until said mixture becomes colorless whereby the nitro substituent of said compound is reduced to amino and (e) recovering said N-(β-ureidoalkyl) paraphenylenediamine.

4,008,273

TERTIARY ALKYL SEMICARBAZIDES AND THEIR METHOD OF PREPARATION

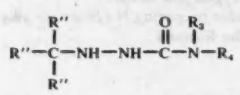
Ronald Edward MacLeay, Williamsville, and Chester Stephen Sheppard, Kenmore, both of N.Y., assignors to Pennwalt Corporation, Philadelphia, Pa.

Continuation of Ser. No. 149,042, June 1, 1971, abandoned, which is a division of Ser. No. 725,180, April 29, 1968, abandoned, which is a continuation-in-part of Ser. No. 616,158, Feb. 15, 1967, abandoned, which is a continuation-in-part of Ser. No. 409,306, Nov. 5, 1964, abandoned. This application Apr. 7, 1975, Ser. No. 565,898

Int. Cl.² C07C *133/02*

U.S. Cl. 260—554 **4 Claims**

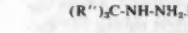
1. A composition having the formula:



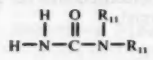
where:(a) R'' is a lower alkyl, benzyl, phenethyl, phenyl radical or hydrocarbon substituted phenyl radical and not more than one phenyl radical or hydrocarbon substituted phenyl radical may be present; and

b. R_3 and $R_4$are hydrogen, lower aliphatic or cycloaliphatic radicals.

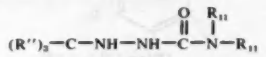
3. A process which comprises: reacting a hydrazine salt of the formula



with a urea of the formula



in an aqueous medium at a temperature between about 40° C. and 100° C. to form a semicarbazide of the formula



where:

a. R_{11} is hydrogen or lower alkyl radical;

b. X' is chloro, bromo, iodo, or HSO_4 radical; and

c. R'' is a lower alkyl, and recovering the semicarbazide formed.

4,008,274

CERTAIN SALICYLANILIDES

Kenichi Sawatari; Toshihiko Mukai, both of Nakatsu; Satoshi Oda, Yoshitomi; Hiroyuki Akashi, Fukuoka, and Masanori Kohara, Nakatsu, all of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

Filed June 25, 1974, Ser. No. 482,916

Claims priority, application Japan, June 25, 1973, 48-71969

Int. Cl.² C07C *103/26*

U.S. Cl. 260—559 S **13 Claims**

1. The compound 2',5-Dimethyl-4'-nitrosalicylanilide.

11. The compound 5-Tert-amyl-4'-nitrosalicylanilide.

13. The compound 5-Tert-amyl-2'-methoxy-4'-nitrosalicylanilide.

4,008,275

PROCESS FOR ISOLATING 4,4'-DIAMINODIPHENYLMETHANE

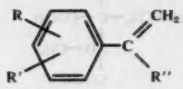
Adnan A. R. Sayigh, North Haven; Kwok K. Sun, Hamden, and Henri Ulrich, Northford, all of Conn., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Aug. 18, 1975, Ser. No. 605,752

Int. Cl.² C07C *85/26*

U.S. Cl. 260—570 D **15 Claims**

1. A process for selectively removing 2,2'- and 2,4'-diaminodiphenylmethane from admixtures thereof with 4,4'-diaminodiphenylmethane which process comprises heating said mixture of diamines at 30° to 100° C in the presence of (i) a compound of the formula:



(I)

wherein R and R' are each independently selected from the group consisting of hydrogen and amino and R'' is selected from the group consisting of hydrogen and alkyl from 1 to 4 carbon atoms, inclusive, and (ii) a catalyst selected from the group consisting of aqueous mineral acid, clays, diatomaceous earths and zeolites.

4,008,276

PHENYL-LOWER-ALKYLAMINES

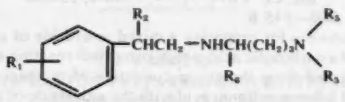
Bernard L. Zenitz, Colonie, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 542,552, Jan. 20, 1975, Pat. No. 3,965,105. This application Dec. 22, 1975, Ser. No. 642,758

Int. Cl.² C07C *91/28*

U.S. Cl. 260—570.5 P **2 Claims**

1. A compound having the formula:



where R_1 represents lower-alkyl containing from one to four carbon atoms; R_2 represents methyl; R_5 represents ethyl; and R_6 represents methyl.

4,008,277

BENZO-BICYCLONONENE DERIVATIVES

Colin Leslie Hewett, and David Samuel Savage, both of Glasgow, Scotland, assignors to Akzona Incorporated, Asheville, N.C.

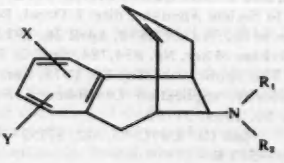
Filed Mar. 31, 1975, Ser. No. 563,435

Claims priority, application United Kingdom, Apr. 8, 1974, 15,558/74

Int. Cl.² C07C *87/40*, *91/16*, *87/28*; A01N *9/20*

U.S. Cl. 260—571 **4 Claims**

1. A compound of the formula:



and pharmaceutically acceptable salts thereof, in which

R_1 and R_2 stand for hydrogen, alkyl of 1 to 6 carbon atoms, or alkenyl of 2 to 6 carbon atoms, and

X and Y stand for hydrogen, hydroxy, halogen, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, nitro and trifluoromethyl.

4,008,278

PREPARATION OF 2-AMINO-5-HALOBENZOTRIFLUORIDE

Max M. Boudakian, Pittsford, N.Y., assignor to Olin Corporation, New Haven, Conn.

Filed Sept. 4, 1975, Ser. No. 610,130

Int. Cl.² C07C *87/60, 85/24*

U.S. Cl. 260—578 **6 Claims**

1. An improved process for preparing 2-amino-5-halobenzotrifluoride comprising

reacting an aminobenzotrifluoride selected from the group consisting of o-aminobenzotrifluoride,

o-acetaminobenzotrifluoride, and' o-formylaminobenzotrifluoride with a halogen source selected from the group consisting of hydrochloric, hydrobromic and hydroiodic acid in the presence of an oxidant selected from the group consisting of hydrogen peroxide, sodium peroxide, potassium chlorate, potassium bromate and potassium permanganate to produce a product consisting essentially of said 2-amino-5-halobenzotrifluoride.

4,008,279

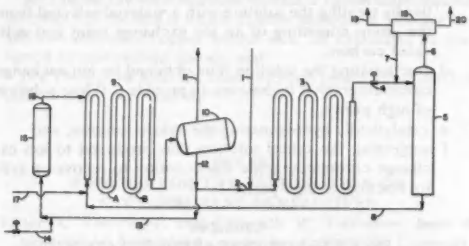
PROCESS FOR DEHALOGENATION AND/OR PREVENTION OF HALOGENATION

Jorge A. Blay, Corpus Christi, Tex., assignor to Celanese Corporation, New York, N.Y.

Filed Aug. 15, 1974, Ser. No. 497,609

Int. Cl.² C07C *47/06, 47/14*

U.S. Cl. 260—601 R **4 Claims**



1. In a continuous conversion process or converting an alkene to an aldehydo alkane product, which conversion process comprises the steps of:

a. passing said alkene through an alkene reaction zone concurrently with an acidic oxidant catalyst solution comprising a liquid containing a noble metal oxidation catalyst, cupric ions, and chloride ions, whereby said alkene is oxidized to form a reaction product comprising predominantly said aldehydo alkane product admixed with said catalyst solution in a chemically reduced condition; b. separating said reaction product into fractions comprising (i) an aldehydo alkane product fraction and (ii) a reduced catalyst solution fraction containing said noble metal and copper in a reduced form, including cuprous chloride in solution and as cuprous chloride crystals, and also containing hydrochloric acid, and also conaining amounts of said aldehydo alkane as well as alpha chlorinated aldehydo alkane;

c. in an elongated plug-flow reoxidizer reoxidizing said reduced catalyst solution with a gas comprising molecular oxygen to oxidize a portion of the copper values contained therein to the cupric form; and

d. recycling the resulting reoxidized catalyst solution to said alkene reaction zone; the improvement which comprises adding said gas comprising molecular oxygen to said catalyst reoxidation zone in a plurality of increments, each increment being added to said catalyst reoxidation zone at different points situated along the length of said zone; the first of said points being at the beginning of said zone.

4,008,280

PROCESS FOR PRODUCTION OF ACROLEIN

Yoshihisa Watanabe; Toshiyuki Sugihara; Kenji Takagi; Makoto Imanari, and Naohiro Nojiri, all of Ami, Japan, assignors to Mitsubishi Petrochemical Company Limited, Tokyo, Japan

Continuation of Ser. No. 312,732, Dec. 29, 1971, abandoned. This application Oct. 1, 1974, Ser. No. 511,473

Claims priority, application Japan, Dec. 29, 1970, 50-121235; Dec. 29, 1970, 50-121238; Dec. 29, 1970, 50-121239

Int. Cl.² C07C *45/04*

U.S. Cl. 260—604 R **10 Claims**

1. A process for producing acrolein by vaporphase catalytic oxidation of propylene with molecular oxygen, which comprises oxidizing propylene with molecular oxygen at a temperature of 240° to 450° at a pressure of 0.5 to 10 atmospheres of pressure over a catalyst of a composition represented by the formula

$$Mo_aBi_bCo_cNi_dFe_eO_fB_gNa_hSi_j$$

the boron having been introduced in the catalyst in the form of a sodium borate and the subscript characters a through j designate the respective numbers of atoms are as follows:

$a = 12$

$b = 0.1$ to 10

$c = 0$ to 10

$d = 0$ to 10

$c + d = 0.1$ to 15

$e = 0.05$ to 8

$f = 25$ to 120

$g = 0.01$ to 2

$h = 0.01$ to 2

$g + h = 0.02$ to 4

$j = 0$ to 40.

4,008,281

ASYMMETRIC CATALYSIS

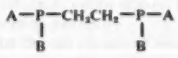
William S. Knowles, St. Louis; Milton J. Sabacky, Ballwin, and Billy D. Vineyard, St. Louis, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 421,463, Dec. 3, 1973, abandoned. This application Oct. 15, 1974, Ser. No. 514,987

Int. Cl.² C07F *9/50, 9/53*

U.S. Cl. 260—606.5 P **16 Claims**

1. An optically active compound represented by the structural formula



wherein A and B each independently represent substituted and unsubstituted alkyl of from 1 to 12 carbon atoms, substituted and unsubstituted cycloalkyl having from 4 to 7 carbon atoms, substituted and unsubstituted aryl, provided that such substituents provide no significant interference with the steric requirements around the phosphorus atom, either A or B must be an aryl group having an alkoxy substituent at the ortho position and A and B are different.

4,008,282

PREPARATION OF TRIARYL PHOSPHINES

John Melvin Townsend, Belleville, and Donald Herman Valentine, Jr., Westfield, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation-in-part of Ser. No. 425,012, Dec. 14, 1973, abandoned. This application Oct. 29, 1974, Ser. No. 518,326

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.[2] C07F *9/02*

U.S. Cl. 260—606.5 P 14 Claims

1. A process for producing a tertiary aryl phosphine from the corresponding tertiary aryl phosphine oxide comprising reacting said phosphine oxide with hydrogen in the presence of sulfur or selenium catalyst, said reaction being carried out in the presence of silicon tetrahalide as an auxiliary agent, said reaction taking place at a temperature of from 50°C. to 400°C. and pressures of from 100 p.s.i.g. to 2000 p.s.i.g.

4,008,283

1,1-BIS(1-METHYL-2-VINYL-4,6-HEPTADIENOXY) ALKANE AND METHOD FOR THE PRODUCTION THEREOF

Satoru Enomoto, Fujisawa; Yutaka Mukaida, Tokyo; Mikiro Yanaka, Matsudo; Sadao Nishita, Tokyo; Hisayuki Wada, Tokyo, and Hitoshi Takita, Tokyo, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

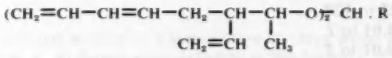
Filed June 17, 1976, Ser. No. 696,929

Claims priority, application Japan, Aug. 5, 1975, 50-094690

Int. Cl.[2] C07C *43/30*

U.S. Cl. 260—615 A 4 Claims

1. A 1,1-bis(1'-methyl-2'-vinyl-4',6'-heptadienoxy)alkane of the generic formula:



wherein R denotes H or an alkyl group of 1 to 7 carbon atoms.

4,008,284

NOVEL PHENOL DERIVATIVES

Kuniaki Goto, Tokyo; Harumi Asai, Kamakura, and Tadao Natsuume, Yokosuka, all of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan

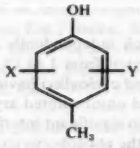
Filed June 9, 1975, Ser. No. 584,931

Claims priority, application Japan, June 19, 1974, 49-69171

Int. Cl.[2] C07C *39/12*

U.S. Cl. 260—619 D 4 Claims

1. A compound of the formula



wherein X and Y each represent a cyclopentyl group.

4,008,285

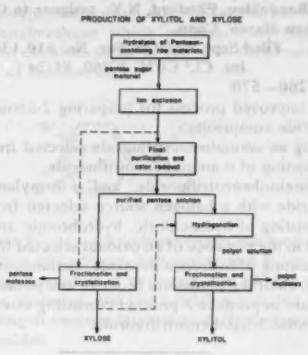
PROCESS FOR MAKING XYLITOL

Asko J. Melaja, Niittypolku 6, Kantvik, and Lauri Hämäläinen, Rajakallio C, 02460 Kantvik, both of Finland

Division of Ser. No. 463,037, April 22, 1974, abandoned, which is a continuation-in-part of Ser. No. 354,391, April 25, 1973, abandoned. This application June 18, 1975, Ser. No. 588,022

Int. Cl.[2] C07C *31/18*; C13K *13/00*

U.S. Cl. 260—635 C 16 Claims



1. A method for the production of xylitol on a commercial scale from a pentose-rich solution obtained by acid hydrolysis of a pentosan-containing raw material which comprises the steps of

a. removing suspended solids from the solution by mechanical filtration;

b. removing inorganic salts and the major portion of organic impurities and color from the solution by ion exclusion;

c. removing the balance of color and other organic impurities by treating the solution with a material selected from the group consisting of an ion exchange resin and activated carbon;

d. fractionating the solution thus obtained by ion exchange chromatographic techniques to provide a xylose solution of high purity;

e. catalytically hydrogenating the xylose solution; and

f. subjecting the xylitol solution thus produced to ion exchange chromatographic fractionation to recover a xylitol fraction of high purity.

4,008,286

PROCESS FOR PREPARING GLYCOLS

Isao Hirose, and Hiroyuki Okitsu, both of Iwakuni, Japan, assignors to Teijin Limited, Osaka, Japan

Filed Feb. 20, 1976, Ser. No. 659,853

Claims priority, application Japan, Feb. 20, 1975, 50-20351; Feb. 5, 1976, 51-10816

Int. Cl.[2] C07C *29/02*

U.S. Cl. 260—635 H 13 Claims

1. A process for making glycols comprising contacting an aliphatic olefin with 2–4 carbon atoms with an aqueous medium containing

i. at least one cation selected from the group consisting of copper ions and iron ions, and

ii. an anion which at least includes a bromine ion and can solubilize copper and/or iron at 100°–200° C., to form a glycol corresponding to the starting olefin, which is characterized in that the concentrations of the cation and anion and the ratio therebetween are controlled to satisfy the following conditions:

I. when the cation in the aqueous medium is a copper ion,

$$0.4 \leq [Cu^{I}] \leq 2.5 \quad (1)$$

$$0.8 \leq [Br^{-}] \leq 4.0 \quad (2)$$

$$1.75\,[Cu^{I}] \leq [A^{I}] \leq 2.0\,[Cu^{I}] \quad (3)$$

$$0.8\,[Cu^{I}] \leq [Br^{-}] \leq 1.95\,[Cu^{I}] \quad (4)$$

II. when the cation in the aqueous medium is an iron ion,

$$0.3 \leq [Fe^{I}] \leq 2.0 \quad (5)$$

$$0.5 \leq [Br^{-}] \leq 6.0 \quad (6)$$

$$2.0\,[Fe^{I}] \leq [A^{I}] \leq 3.0\,[Fe^{I}] + 4.0 \quad (7)$$

$$1.0\,[Fe^{I}] \leq [Br^{-}] \leq 3.0\,[Fe^{I}] + 1.0 \quad (8)$$

and

III. when the cation in the aqueous medium consists of copper and iron ions,

$$0.05 \leq [Cu^{I}] + [Fe^{I}] \leq 1.6 \quad (9)$$

$$0.01 \leq [Cu^{I}] \quad (10)$$

$$0.01 \leq [Fe^{I}] \quad (11)$$

$$0.5 \leq [Br^{-}] \leq 4.0 \quad (12)$$

$$2.0\,\{[Cu^{I}]+[Fe^{I}]\} \leq [A^{I}] \leq 3.5\,\{[Cu^{I}]+[Fe^{I}]\}+4.0 \quad (13)$$

$$1.0\,\{[Cu^{I}]+[Fe^{I}]\} \leq [Br^{-}] \leq 3.5\,\{[Cu^{I}]+[Fe^{I}]\} \quad (14)$$

provided that, in the foregoing formulae (1) through (14), $[Cu^{I}]$, $[Br^{-}]$, $[A^{I}]$ and $[Fe^{I}]$ respectively denotes the total ion concentration per liter of the aqueous medium,

$[Cu^{I}]$ being the total ion concentration (gram-atom/liter) of ionized copper (Cu^{+} and Cu^{++})

$[Br^{-}]$ being the total ion concentration gram-atom/liter) of the bromine ion which can solubilize copper and/or iron,

$[A^{I}]$ being the total ion concentration (gram-ionic equivalent/liter) of the anion which at least includes a bromine ion and can solubilize copper and/or iron, all calculated as converted to monovalent anions, and

$[Fe^{I}]$ being the total ion concentration (gram-atom/liter) of ionized iron (Fe^{++} and Fe^{+++}).

4,008,287

PROCESS FOR THE PREPARATION OF CYCLOPROPANE DERIVATIVES

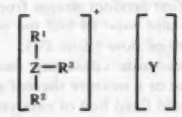
Pieter A. Verbrugge, and Elisabeth W. Uurbanus, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 359,930, May 14, 1973, abandoned. This application June 17, 1975, Ser. No. 587,783

Int. Cl.² C07C *23/04, 23/18, 17/00*

U.S. Cl. 200—648 D **6 Claims**

1. In a process for preparing gem-dihalocyclopropane derivatives by reacting an alkene optionally substituted by one or more aromatic groups or halogen atoms with a dihalocarbene in the presence of a catalyst, the improvement which comprises employing as catalyst an onium compound having the general formula



(1)

in which R^1, R^2 and R^3 each is alkyl or cycloalkyl of up to 40 carbon atoms, Z is an atom of an element of Group VIA of the Periodic Table of the Elements having an atomic number of more than 15 and Y is an anion.

4,008,288

HYDROCARBON ISOMERIZATION PROCESS USING PLATINUM/ALUMINA CATALYST ACTIVATED AND COOLED WITH HCL

John W. Myers, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 458,700, April 8, 1974, Pat. No. 3,970,589. This application Mar. 5, 1976, Ser. No. 664,217

Int. Cl.² C07C *5/30*

U.S. Cl. 260—666 P **14 Claims**

1. A hydrocarbon conversion process which comprises contacting an isomerizable hydrocarbon selected from the group consisting of acyclic paraffins and naphthenes under isomerization conditions with an active alumina supported platinum catalyst prepared by contacting said catalyst at a temperature within the range of 600°–1500° F with a dry activating gas comprising 30 to 100 volume percent anhydrous hydrogen chloride for at least 0.1 hour;

and thereafter cooling the thus-activated catalyst for a time of at least 0.5 hour in the presence of a dry carrier gas containing 1 to 20 volume percent anhydrous hydrogen chloride.

4,008,289

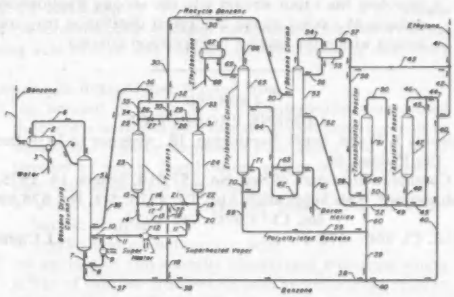
ADSORBENT TREATING METHOD

Dennis J. Ward, South Barrington, and George R. Winter, III, Des Plaines, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed July 7, 1975, Ser. No. 594,142

Int. Cl.² C07C *7/12*

U.S. Cl. 260—671 R **7 Claims**



1. A method of removing adsorbed material from a solid adsorbent in a process employing a fractionation column, which comprises the steps of:

a. removing a liquid hydrocarbon bottoms stream from the lower portion of said column and reboiling the same to form vapors;

b. returning a portion of said vapors to the lower portion of the column;

c. superheating another portion of said vapors to a temperature sufficient to vaporize the adsorbed material from said adsorbent;

d. contacting the superheated vapors with the adsorbent and thereby removing adsorbed material from the adsorbent; and

e. supplying the resultant vapor stream to the lower portion of said fractionation column.

6. In a process for the alkylation of benzene wherein:

a. benzene is passed into a benzene drying column to form a dry benzene feed stream;

b. the dry benzene feed stream is reacted with an olefin in an alkylation zone containing a boron halide promoted catalyst, and an alkylation zone effluent comprising benzene, an alkylaromatic hydrocarbon and boron oxide hydrates is removed from the alkylation zone and passed into a fractionation zone;

c. the formation of a volatile complex containing the boron oxide hydrate is effected by admixing the boron oxide

hydrates with a boron halide within the fractionation zone, and the complex is removed from the fractionation zone dissolved in a distillate stream comprising benzene; and,

d. the distillate stream is passed through a bed of a solid adsorbent which is periodically replaced and which removes the complex from the distillate stream, the improvement in the method of replacing the solid adsorbent which comprises drying the solid adsorbent with a vapor stream formed by vaporizing and superheating liquid removed from the bottom of the benzene drying column, and then returning the vapor stream to the benzene drying column and using the vapor stream as stripping vapor.

7. A method of drying a solid adsorbent used to treat a recycle benzene stream in a process for the alkylation of benzene wherein an alkylation zone effluent is formed by reacting benzene with ethylene in the presence of a boron halide promoted catalyst and the recycle benzene stream is formed by fractionating the alkylation zone effluent in a first fractionation column, which method comprises the steps of:

a. withdrawing a hydrocarbon stream comprising monoalkylated and polyalkylated benzenes from the first fractionation column and passing the hydrocarbon stream into a second fractionation column;

b. withdrawing a liquid stream comprising a polyalkylated benzene from the second fractionation column, and effecting the formation of a vapor stream by vaporizing the liquid stream;

c. superheating the vapor stream;

d. contacting the solid adsorbent with the vapor stream and effecting the drying of the solid adsorbent; and,

e. injecting the vapor stream into the second fractionation column at a point above the lowest distillation tray contained within the second fractionation column.

4,008,290

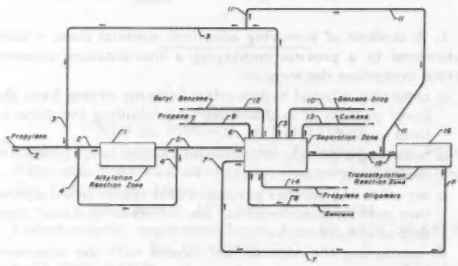
CUMENE PRODUCTION

Dennis J. Ward, South Barrington, Ill., assignor to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 557,010, March 10, 1975, abandoned. This application Apr. 19, 1976, Ser. No. 678,005

Int. Cl.² C07C *3/62*, *3/54*

U.S. Cl. 260—672 T **11 Claims**



1. A process for the production of cumene which comprises the steps of:

a. reacting propylene with an excess of benzene in the presence of an alkylation catalyst at alkylation reaction conditions in an alkylation reaction zone;

b. dividing the total liquid effluent of said zone into at least two portions of like composition;

c. recirculating one of said portions of the effluent to said reaction zone;

d. introducing another of said portions of said effluent and a transalkylation zone effluent stream, formed as hereinafter set forth, into a separation zone;

e. separating from the admixed effluents in the separation zone a benzene-rich stream, a cumene product stream and a di- and triisopropylbenzene-rich stream;

f. transalkylating the last named stream with benzene in the presence of a transalkylation catalyst in a transalkylation zone to form additional cumene;

g. supplying the effluent of the last mentioned zone to said separation zone as said transalkylation zone effluent stream;

h. passing at least a portion of said benzene-rich stream from the separation zone to said alkylation reaction zone; and

i. recovering said cumene product stream from the separation zone.

4,008,291

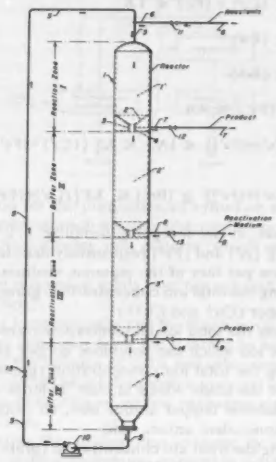
SIMULATED MOVING BED ALKYLATION PROCESS

Robert F. Zabransky, Oak Brook, and Robert F. Anderson, La Grange Park, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed June 16, 1975, Ser. No. 587,470

Int. Cl.² C07C *3/52*

U.S. Cl. 260—683.43 **14 Claims**



1. A continuous fixed bed catalytic alkylation reaction and catalyst reactivation process comprising the steps of:

a. providing a crystalline aluminosilicate zeolite catalyst composited with a Group VIII metal hydrogenation agent in a fixed bed containing four zones and having a fluid flow connecting path between said zones to interconnect said zones;

b. arranging said zones in a series and providing fluid flow connecting means between the last zone and the first zone of the series to provide a directional circular flow path through said zones;

c. providing a point between each two successive zones for introducing an inlet stream or withdrawing a product stream;

d. introducing a reactivation stream including alkylatable hydrocarbon and hydrogen at a first point located between two successive zones (zone II and zone III) to effect catalyst reactivation and to provide alkylatable hydrocarbon as a continuous component throughout said fixed bed of catalyst;

e. simultaneously withdrawing a first product stream from a second point located between said zone III and the next successive zone in the direction of flow (zone IV);

f. simultaneously introducing reactants consisting essentially of isobutane or isopentane or a mixture thereof and at least one C_2–C_5 olefin into said fixed bed of catalyst at a third point located between said zone IV and the next successive zone in the direction of flow (zone I) and reacting said reactants at a temperature of from about 100° to about 400° F. to effect an alkylation reaction, a result of which is deactivation of said catalyst, said alkylation and catalyst reactivation being the principal reactions of the process;

g. simultaneously withdrawing a second product stream from a fourth point located between said zone I and the next successive zone in the direction of flow (zone II); and,

g. periodically advancing downstream the points of charging said reactants and said reactivation stream, and the points of withdrawal of said product streams to the next successive point for introducing inlet stream or withdrawing an outlet stream.

7. A continuous fixed bed catalytic alkylation reaction and catalyst reactivation process comprising the steps of:

a. providing a crystalline aluminosilicate zeolite catalyst composited with a Group VIII metal hydrogenation agent in a fixed bed containing three zones and having a fluid flow connecting path between said zones to interconnect said zones;

b. arranging said zone in a series and providing fluid flow connecting means between the last zone and the first zone of the series to provide a directional circular flow path through said zones;

c. providing a point between each two successive zones for introducing an inlet stream or withdrawing a product stream;

d. introducing a reactivation stream including alkylatable hydrocarbon and hydrogen at a first point located between two successive zones to effect catalyst reactivation and to provide alkylatable hydrocarbon as a continuous component throughout said fixed bed of catalyst;

e. simultaneously withdrawing a first product stream from a second point located between another two successive zones;

f. simultaneously introducing reactants consisting essentially of isobutane or isopentane or a mixture thereof and at least one C_2-C_5 olefin into said fixed bed of catalyst at a third point located between the remaining two successive zones and reacting said reactants at a temperature of from about 100° to about 400° F. to effect an alkylation reaction, a result of which is deactivation of said catalyst, said alkylation and catalyst reactivation being the principal reactions of the process; and

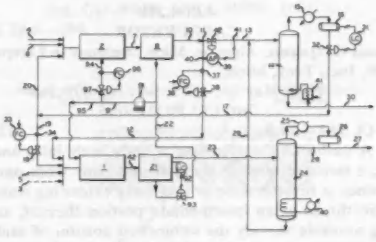
g. periodically advancing downstream the points of charging said reactants and said reactivation stream, and the point of withdrawal of said product stream to the next successive points for introducing an inlet stream or withdrawing an outlet stream.

4,008,292

RECYCLE OF ISOPARAFFIN-BUTYLENE HYDROCARBON TO ISOPARAFFIN-PROPYLENE ALKYLATION REACTION

John P. James, Sweeny, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 13, 1976, Ser. No. 657,817
Int. Cl.² C07C 3/54
U.S. Cl. 260—683.45 8 Claims



1. An alkylation process in which an alkylate is produced from an isoparaffin having 4 to 6 carbon atoms and a monoolefin having 3 to 5 carbon atoms comprising

a. contacting a first isoparaffin feed stream with a propylene stream and a hydrogen fluoride alkylation catalyst in a first alkylation zone,

b. removing a first alkylation effluent from said first alkylation zone and separating it into a first catalyst phase and a first hydrocarbon phase,

c. contacting a second isoparaffin feed stream with a butylene stream and a hydrogen fluoride alkylation catalyst in a second alkylation zone,

d. removing second alkylation effluent from said second alkylation zone and separating it into a second catalyst phase and second hydrocarbon phase,

e. splitting said second hydrocarbon phase into a first portion and a second portion,

f. introducing said first portion of said second hydrocarbon phase into said first alkylation zone,

g. recovering the alkylation product from the second portion of said second hydrocarbon phase and from said first hydrocarbon phase.

4,008,293

CROSSLINKABLE COATING COMPOSITIONS AND METHOD OF USING THE SAME

Rudolf Maska, Pittsburgh, and Donald P. Hart, Allison Park, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Aug. 1, 1974, Ser. No. 493,798
Int. Cl.² C08L 61/26; C08F 20/58
U.S. Cl. 260—856 12 Claims

1. A crosslinkable coating composition free of external strong acid catalyst and having a binder consisting essentially of

a. an acrylic interpolymer formed from

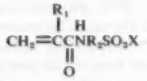
1. an amount of a plurality of ethylenically unsaturated monomers having at least one site for crosslinking with an aminoplast resin in the rane of from about 1 to about 50 percent by weight based on the weight of said interpolymer, said monomers comprising

a. hydroxy ester of ethylenically unsaturated monocarboxylic acid, and

b. acrylic acid or methacrylic acid;

2. an amount of ethylenically unsaturated monomer which is free of sites for crosslinking with an aminoplast resin in the range of from about 45 to about 98 percent by weight based on the weight of said interpolymer;

3. an amount of at least one ethylenically unsaturated sulfonic monomer represented by the formula



wherein

R_1 is hydro, lower alkyl, lower cycloalkyl, phenyl, furyl or halo,

R_2 is a bivalent saturated hydrocarbon radical having its valence bonds on different carbon atoms,

X is hydro, ammonium or amine, in the range of from about 0.25 to about 1.5 percent by weight based on the weight of said interpolymer; and

b. an aminoplast resin wherein

c. said binder constitutes from about 5 to about 100 percent by weight of said crosslinkable coating composition;

d. said binder contains from about 25 to about 97 percent by weight of said acrylic interpolymer; and

e. said binder contains from about 30 to about 95 percent by weight of said aminoplast resin.

4,008,294

THICKENED POLYESTER COMPOSITION CONTAINING ULTRAFINE POLYPROPYLENE FIBERS

Nelson S. Marans, Silver Spring; Thomas E. Ferington, Columbia, both of Md., and Philip Messina, Colonia, N.J., assignors to W. R. Grace & Co., New York, N.Y.

Division of Ser. No. 527,514, Nov. 27, 1974, abandoned. This application July 22, 1975, Ser. No. 598,099

Int. Cl.² C08K *7/02*

U.S. Cl. 260—862 **2 Claims**

1. In a liquid ethylenically unsaturated polyester resin composition comprising a curable ethylenically unsaturated polyester resin composition comprising a polyester resin of a polyhydric alcohol and an ethylenically unsaturated polycarboxylic acid admixed with styrene, the improvemet comprising the presence in the composition of an amount of short ultrafine polypropylene fibers effective for causing the composition to have a thixotropic index of 1.5-8 over a 10 fold change in the rate of spindle rotation, the viscosity being determined with a Brookfield viscometer using a number 4 spindle, the spindle rotating 6 and 60 times per minute respectively.

4,008,295

THERMOPLASTIC RESIN COMPOSITION

Toshiro Koshida, Kobe, and Yasuo Nakagawa, Nishinomiya, both of Japan, assignors to Sumitomo Bakelite Company, Limited, Tokyo, Japan

Filed July 18, 1975, Ser. No. 597,185

Claims priority, application Japan, July 22, 1974, 49-83233; July 31, 1974, 49-87052

Int. Cl.² C08L *51/04*

U.S. Cl. 260—876 R **15 Claims**

1. A vinyl chloride resin composition comprising 40 to 60% by weight of a vinyl chloride-ethylene copolymer having an average degree of polymerization of 300 to 500 and an ethylene content of 1 to 10% by weight and 60 to 40% by weight of an acrylonitrile-methyl methacrylate-butadiene-styrene quadripolymer having a heat deformation temperature of 80° to 100° C.

4,008,296

ESTERS OF N-PHOSPHONOMETHYLGLYCINONITRILE

John Edward Duncan Barton, Wokingham, England, assignor to Imperial Chemical Industries Limited, London, England

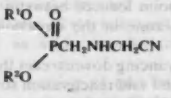
Division of Ser. No. 405,258, Oct. 11, 1973, Pat. No. 3,923,877. This application Aug. 15, 1975, Ser. No. 605,173

Claims priority, application United Kingdom, Nov. 8, 1972, 51442/72

Int. Cl.² C07F *9/09*; **A01N** *9/36*

U.S. Cl. 260—940 **2 Claims**

1. An ester of N-phosphonomethylglycinonitrile, having the formula:



wherein R^1 and R^2 each represent an alkyl radical of from 1 to 6 carbon atoms.

4,008,297

AUTOMATIC STARTING DEVICE OF CARBURETOR

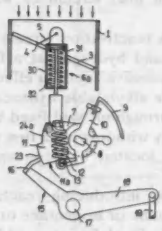
Andre Nartowski, Boulogne-Billancourt, France, assignor to Regie Nationale des Usines Renault; Boulogne-Billancourt, Automobiles Peugeot, Paris, both of, France

Filed Sept. 16, 1975, Ser. No. 613,872

Claims priority, application France, Sept. 23, 1974, 74.32010

Int. Cl.² F02M *1/10*

U.S. Cl. 261—39 B **1 Claim**



1. The automatic starting device of carburetors of internal combustion engines, which comprises a strangler starter shutter disposed upstream of a starter jet, a linkage for controlling said shutter incorporating a variable angular position shaft operatively connected to a temperature responsive element capable in the cold engine condition to keep said shutter closed and to gradually open same as the engine warms up, a cam freely rotatable relative to said shaft and connected through spring means to an element movable with said shaft and adapted to co-act with the linkage means positively controlling the carburetor throttle, said cam comprising a first cam face controlling the normal starter idling position of said throttle, followed by another cam face adapted to set said throttle in an accelerated idling position, said strangler starter shutter control linkage further comprising resilient connecting means adapted to yield when said shutter is fully open while said accelerated idling throttle control cam face has such amplitude that it can still co-act along a predetermined stroke with said positive throttle control linkage after said strangler starter shutter has reached its fully open position.

4,008,298

CARBURETOR

Norman G. Quantz, Algonac, Mich., assignor to Lectron Products, Inc., Troy, Mich.

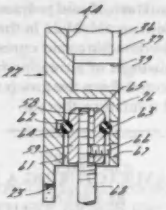
Filed May 16, 1975, Ser. No. 578,265

Int. Cl.² F02M *9/06*

U.S. Cl. 261—44 R **12 Claims**

1. A carburetor comprising a body with inlet and outlet ends, a throat extending through said body from one end to the other, a throttle slide in said body extending transversely to said throat at an intermediate portion thereof, said slide being movable to vary the unblocked portion of said throat, guide means on opposite sides of said throat coacting with complementary guide means on said slide to support the slide during said movement, a fuel tube extending transversely to said throat and having an opening into the throat, a pin disposed in said tube and being tapered with the widest portion of

the taper adjacent said opening, and means mounting the end of said pin adjacent said widest portion of the taper, said mounting means being so constructed as to permit limited translatory as well as pivotal movement of said end of the pin with respect to said slide in directions transverse to the extent of said tube, so as to compensate for tolerance variations



between said guide means on the throat and said opening, said mounting means comprising a bore in the underside of said slide, an enlargement on said end of the pin within and narrower than said bore, and interfitting ring-and-groove means on said enlargement and bore permitting said translatory and pivotal movements.

4,008,299

METHOD OF MAKING A FIBRE OF ALUMINIUM PHOSPHATE

James Derek Birchall, and John Edward Cassidy, both of The Heath, Runcorn, Cheshire, England

Division of Ser. No. 274,964, July 25, 1972, Pat. No. 3,870,737, which is a continuation of Ser. No. 42,499, June 1, 1970. This application Oct. 21, 1974, Ser. No. 516,777

Claims priority, application United Kingdom, June 12, 1969, 29862/69

Int. Cl.² C04B *35/64, 35/76*

U.S. Cl. 264—63 **14 Claims**

1. A method of preparing an aluminium phosphate fibre comprising the steps of fibrising a composition containing a solution of a halogen-containing complex phosphate of aluminium containing at least one chemically-bound molecule of a hydroxy compound R-OH wherein R is a hydrogen atom or an aliphatic group having from 1 to 10 carbon atoms, the ratio of the number of gram atoms of aluminium to the number of gram atoms of phosphorus being in the range 1:2 to 2:1, in a solvent selected from the group consisting of water, aliphatic alcohols, esters, polyhydric alcohols, and mixtures thereof, and drying the aluminium phosphate fibre so formed.

4,008,300

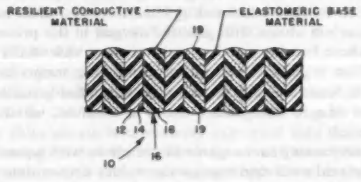
MULTI-CONDUCTOR ELEMENT AND METHOD OF MAKING SAME

Timothy R. Ponn, Cleveland, Ohio, assignor to A & P Products Incorporated, Painesville, Ohio

Filed Oct. 15, 1974, Ser. No. 514,572

Int. Cl.² H01R *13/24;* **H05K** *1/04*

U.S. Cl. 264—104 **3 Claims**



1. The method of producing a multi-conductor element, which comprises the steps of forming a plurality of holes through a board made of a resiliently deformable and electrically insulative material, resiliently deforming the board to diametrically enlarge the holes in the same, filling the thus enlarged holes with a slurry of electrically conductive material in an uncured flowable vehicle that is resilient when cured, curing the vehicle in the enlarged holes, and then releasing the board from deformation for return of the holes to normal diameter, such relative constriction of the holes applying sufficient radial force on the cured resilient conductors therein as to cause the latter to bulge outwardly beyond the surfaces of the board.

3. The method of producing a multi-conductor element, which comprises the steps of forming a plurality of holes through a board made of a resiliently deformable and electrically insulative material, resiliently deforming the board to enlarge the holes in the same by filling the holes under pressure with a slurry of electrically conductive material in an uncured flowable vehicle that is resilient when cured, curing the vehicle in the enlarged holes, and then releasing the board from deformation for return of the holes to normal diameter, such relative constriction of the holes applying sufficient radial force on the cured resilient conductors therein as to cause the latter to bulge outwardly beyond the surfaces of the board.

4,008,301

PROCESS FOR THE PRODUCTION OF NONWOVEN CELLULOSE ACETATE LAMINATE CURED WITH PHENOLIC RESIN

Katsuharu Arisaka, Sakai; Hideo Sawada, Osaka, and Kozo Shimoguchi, Sakai, all of Japan, assignors to Daicel, Ltd., Osaka, Japan

Filed Jan. 22, 1975, Ser. No. 543,180

Claims priority, application Japan, Jan. 24, 1974, 49-10495

Int. Cl.² B29G *7/00*

U.S. Cl. 264—137 **7 Claims**

1. A process for manufacturing a molded article made of a non-woven cellulose acetate fiber web, which consists essentially of the steps of:

a. impregnating substantially uniformly a nonwoven web of fibers consisting essentially of from 50 to 100 weight percent of cellulose acetate fibers, the balance being another fiber selected from the group consisting of polyvinyl chloride fibers, polyethylene glycol terephthalate fibers, polyacrylonitrile fibers and mixtures thereof, with a liquid composition consisting of 35 to 100 weight percent of liquid resol resin, the balance being a plasticizer for cellulose acetate, said impregnated web containing from 5 to 40 weight percent of said liquid resol, based on the total weight of the impregnated web;

b. placing said web between molding surfaces defining a mold cavity;

c. pressing said web to conform same to the shape of said cavity;

d. injecting, simultaneously with step (c), superheated steam at a pressure of from 0.05 to 3.0 kg/cm² and a temperature of from 80° to 150° C through said web at a rate that is effective to prevent condensation of water in said web and for a period of time effective to cure said resol resin;

e. terminating the injection of said steam; and

f. removing the cured cellulose acetate fiber web from said mold.

4,008,302

METHOD OF MOLDING PLASTIC ELEMENTS ON A CONTINUOUS WEB

Irving Erlichman, Wayland, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 26, 1972, Ser. No. 318,003

Int. Cl.² B29D *7/08*

U.S. Cl. 264—156 **8 Claims**

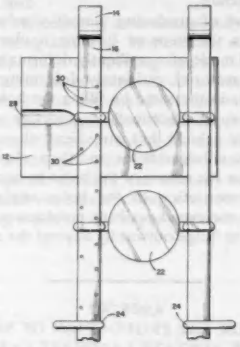
1. A method for forming a continuous web comprising plastic molded elements comprising:

inserting into a mold comprising a cavity a forward portion of at least one continuous runner element;

causing a section of said runner element to traverse a part of the mold cavity and protrude from the mold;

injecting into the mold cavity a liquid material capable of being cured to form a solid;

curing said liquid material in said mold cavity whereby the cured material is secured to the runner section in said mold cavity;



opening said mold and applying sufficient force to said runner to cause the molded part secured thereto to be ejected from the mold;

concomitantly positioning a subsequent portion of said continuous runner element in said cavity; and

closing the mold and repeating the molding and ejection cycle whereby a web comprising molded plastic parts secured to at least one continuous runner element is formed.

4,008,303

PROCESS FOR EXTRUDING GREEN POLYGLYCOLIC ACID SUTURES AND SURGICAL ELEMENTS

Arthur Glick, Danbury, and Lester Daniel Chirgwin, Jr., Stamford, both of Conn., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 176,291, Aug. 30, 1971, abandoned. This application Aug. 3, 1972, Ser. No. 277,537

Int. Cl.² D01D *5/12*

U.S. Cl. 264—210 F **9 Claims**

1. A method of coloring polyglycolic acid surgical elements comprising incorporating 1,4-bis(p-toluidino)-anthraquinone into molten polyglycolic acid to form an optically homogeneous solution and forming solid pellets therefrom, and later melt spinning the green colored polyglycolic acid pellets into filaments in which the 1,4-bis(p-toluidino)-anthraquinone is uniformly dispersed in an optically homogeneously solid solution, said 1,4-bis(p-toluidino)-anthraquinone providing both color and lubricity to aid in extension in the melt spinning.

4,008,304

PROCESS FOR PRODUCING CURED PHENOLIC FILAMENTS HAVING IMPROVED DRAWABILITY

Hiroaki Koyama, Osaka, and Isao Kimura, Suita, both of Japan, assignors to Nippon Kynol Incorporated, Osaka, Japan

Continuation of Ser. No. 331,811, Feb. 12, 1973, abandoned. This application Apr. 16, 1975, Ser. No. 568,462

Claims priority, application Japan, Feb. 23, 1972, 47-18788

Int. Cl.² B29C *25/00*

U.S. Cl. 264—236 **4 Claims**

1. A process for producing melt-spun and cured phenolic undrawn filaments consisting essentially of a fiber-forming polyamide resin selected from the group consisting of nylon-6, nylon-7, nylon-9, nylon-11, nylon-12, nylon-66, nylon-610, nylon-611, nylon-612, nylon-6T, nylon-11T and a copolyamide consisting essentially of these polyamides in the amount of less than 50% by weight based on the total weight of the filaments and a novolak resin in the amount of not less than 50% by weight based on the total weight of the filaments having improved drawability which comprises melt-spinning a fiber-forming novolak resin containing less than 50% by weight of said resin mixture of said polyamide resin, curing the resulting filaments with an aldehyde in the presence of a basic or acid catalyst, and contacting said cured phenolic filaments with at least 25% by weight of a treating reagent in a vapor or liquid phase and selected from the group consisting of methanol and ethanol and a mixture thereof.

4,008,305

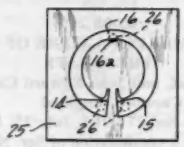
METHOD OF MANUFACTURING A BOOK BINDING ELEMENT

Henry N. Staats, Deerfield, Ill., assignor to General Binding Corporation, Northbrook, Ill.

Division of Ser. No. 169,981, Aug. 9, 1971, abandoned. This application Apr. 16, 1975, Ser. No. 568,548

Int. Cl.² B29C *7/00*

U.S. Cl. 264—336 **4 Claims**



1. A method of making a binding element of a resilient plastic material having a circular configuration of a C-ring with a radial slit forming a pair of ends which are closely adjacent each other, said plastic material having a characteristic of shrinking during cooling from a molding temperature, said method comprising providing a mold having a cavity configuration of the element in a spread condition with the adjacent ends spaced apart a distance greater than said slit, molding the element by inserting a plastic material into the mold cavity at a temperature above the melting point of the plastic material, removing the molded element from the mold, and cooling the element to shrink the adjacent ends of the element substantially together.

4,008,306

METHOD OF RECOVERING MANGANESE VALUES FROM A MIXTURE OBTAINED BY CATALYTICALLY OXIDIZING A PARAFFIN WITH GASEOUS OXYGEN

Takashi Yamashita, and Tadashi Takeshiro, both of Yokohama, Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed June 5, 1975, Ser. No. 584,151

Claims priority, application Japan, June 14, 1974, 49-67720; June 14, 1974, 49-67721

Int. Cl.² C01G *45/00*

U.S. Cl. 423—50 **5 Claims**

1. A method of recovering manganese values from a liquid oxidation mixture obtained by oxidizing a paraffin having 10 to 40 carbon atoms with gaseous oxygen in the presence of a manganese-bearing catalyst, said mixture essentially consisting of an organic liquid phase containing mono-basic fatty acid produced by said oxidation, unsaponifiable matter, and a portion of said manganese values as a solute, which method comprises:

(a) contacting said organic liquid phase with aqueous sulfuric acid until said manganese values accumulate substantially completely in a phase distinct from said organic liquid phase;

(b) separating said organic liquid phase and said distinct phase; and

(c) recovering manganese values from said distinct phase.

2. A method as set forth in claim 1, wherein said aqueous sulfuric acid is at least 0.05-normal but not more than 5-normal, said aqueous sulfuric acid being contacted with said oxidation mixture in an amount stoichiometrically equivalent to 0.5 to 5 times the amount of metal in said oxidation mixture, said distinct phase being an aqueous liquid.

4. A method as set forth in claim 1, wherein said aqueous sulfuric acid is 5-normal to 36-normal sulfuric acid, said aqueous sulfuric acid being contacted with said oxidation mixture in an amount stoichiometrically equivalent to 1.0 to 3 times the amount of metal in said oxidation mixture, said distinct phase being solid.

4,008,307
PRODUCTION OF MONOBASIC POTASSIUM PHOSPHATE BY ION EXCHANGE

Kent W. Loest, Broomfield, and Vernon R. Ewing, Denver, both of Colo., assignors to Southwire Company, Carrollton, Ga.; National Steel Corporation, Pittsburgh, Pa. and Earth Sciences, Inc., Golden, Colo.

Filed June 2, 1975, Ser. No. 582,807
Int. Cl.² C01B *15/16, 25/26;* **C01F** *1/00, 7/02*
U.S. Cl. 423—120 **13 Claims**

1. A process for producing aluminum and monobasic potassium phosphate from alunite and apatite rock which comprises:

a. reacting apatite rock with sulfuric acid to produce phosphoric acid;
b. roasting and leaching the alunite ore to remove water and compounds of sulfur and alkali metals, including potassium sulfate;
c. separating the residue and solution of step (b);
d. digesting the residue from step (c) with at least one alkali metal hydroxide at a concentration and at a temperature sufficient to dissolve substantially all of the aluminum values from said solid residue;
e. separating the liquid and solid portions of the slurry resulting from step (d);
f. removing silica from the liquid portion resulting from step (e) leaving a desilication product which is essentially sodium aluminum silicate;
g. separating the liquid and solid portions resulting from step (f);
h. precipitating aluminum hydroxide from the liquid portion resulting from step (g);
i. separating the aluminum hydroxide precipitate from the mother liquor resulting from step (h);
j. converting the phosphoric acid from step (a) and the potassium sulfate from step (c) by ion exchange into monobasic potassium phosphate, and
k. recovering the monobasic potassium phosphate.

4,008,308
SEPARATION OF COBALT FROM NICKEL THIOCYANATES WITH ISOPHORONE

Patrick Bernard Sullivan, Peekskill, and Glenn Franklin Mitchell, Bedford Hills, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Dec. 18, 1975, Ser. No. 642,306
Int. Cl.² C01G *51/00*
U.S. Cl. 423—139 **4 Claims**

1. In the process for the separation of nickel and cobalt thiocyanate by extracting an aqueous solution thereof having a pH 1.6 to 2.6 with a water immiscible organic solvent whereby thiocyanate is selectively extracted into the organic phase leaving nickel thiocyanate in an aqueous phase, the improvement which comprises using isophorone as the water immiscible organic solvent and the aqueous solution of said nickel and cobalt thiocyanates contains ammonium thiocyanate at a concentration of at least 35 grams per liter of solution.

2. Process claimed in claim 1 where cobalt is recovered from the cyclic ketone organic phase by contacting said organic phase with an aqueous inorganic acid solution having a molarity of at least about five.

4,008,309
PROCESS FOR CRYSTALLIZING CALCIUM NITRATE

Juliu Virgil Florian Moldovan; Maria Suciu, and Eugenia Tomescu, all of Bucharest, Romania, assignors to Institutul de Cercetari Chimice - Icechim, Bucharest, Romania

Continuation-in-part of Ser. No. 338,815, March 7, 1973, abandoned, which is a continuation of Ser. No. 103,327, Dec. 31, 1970, abandoned. This application May 12, 1975, Ser. No. 576,305
Claims priority, application Romania, Jan. 7, 1970, 62059
Int. Cl.² C01F *11/44*
U.S. Cl. 423—167 **6 Claims**

1. A process for preparing large calcium nitrate tetrahydrate crystals comprising the steps of:

a. digesting phosphate rock containing from about 10 to 60% CaO by weight with nitric acid of 30 to 70% concentration by weight to produce a phosphonitrate solution;
b. cooling said solution at a substantially constant rate of substantially 6° to 30° C per hour to a temperature of substantially 17 to 22° C through a temperature fall break, a point of inflection in the characteristic curve of time plotted against temperature with constant cooling rate to crystallize calcium nitrate tetrahydrate and
c. ceasing cooling upon the temperature dropping about 1° C below the temperature at said point thereby intentionally terminating the crystallization when only 40 to at most 60% of the calcium nitrate tetrahydrate is precipitated so as to produce a mother liquor with the resulting crystals in suspension;
d. recovering the mother liquor from 20 to 80% of the suspension produced in step (c) by removing the calcium nitrate tetrahydrate crystals therefrom;
e. combining the remainder of the suspension produced in step (c) with the mother liquor produced in step (d) to form a mixture thereof in a ratio of said remainder of the suspension: mother liquor of step (d) of from 1:2 to 1:0.1 and cooling the resultant mixture at a rate of substantially 12° to 40° C per hour and at a rate at least equal to that of step (b) to a temperature between substantially 12° C and −10° C to crystallize calcium nitrate tetrahydrate from the mixture and precipitate 80 to 85% of the calcium thereof in the form of the crystals of calcium nitrate tetrahydrate having a particle size of from 70 to 1100 microns to produce a crystal-containing liquid with a mother liquor/crystal ratio of substantially from 1:1 to 1:0.1; and
f. removing said crystals with a particle size of from 700 to 1100 microns from said liquid.

4,008,310
REGENERATIVE SULFUR DIOXIDE SCRUBBING SYSTEM

Everett Gorin, Pittsburgh, Pa., assignor to Continental Oil Company, Ponca City, Okla.

Filed May 27, 1975, Ser. No. 581,074
Int. Cl.² C01B *17/00, 7/00*
U.S. Cl. 423—242 **5 Claims**

1. In a regenerative system for the removal of SO_2 from an SO_2-containing gas having a scrubbing circuit which includes a scrubbing zone and a separate sulfite conversion zone in said circuit, and a regenerative section, and where

in said scrubbing circuit there is maintained a continuously recirculating aqueous solution which contains in solution either sodium or potassium thiosulfate in a concentration of at least ten percent by weight of said recirculating solution, and where

in said scrubbing zone the SO_2-containing gas is contacted

under sulfite-forming conditions, with said aqueous solution which contains sodium or potassium carbonate as the effective absorbent for the SO_2 to convert said effective absorbent to the corresponding sulfite, and where

in said separate sulfite conversion zone said sulfite is converted to the corresponding thiosulfate by reaction with the corresponding hydrosulfide and where

in said regenerative section a mixture of the required hydrosulfide and the required carbonate is produced in a regenerated aqueous solution, said regenerative section including a reduction zone in which thiosulfate contained in a slipstream withdrawn from said scrubbing circuit is reacted with a reducing gas containing CO as the effective reducing agent,

the IMPROVEMENT in the regenerative section, whereby the proper ratio of hydrosulfide to carbonate is maintained in said regenerated solution which is returned to said sulfite conversion zone, which inprovement comprises:

1. conducting the reduction of thiosulfate in said reduction zone by the CO-containing reducing gas under conditions effective to produce an effluent aqueous solution which contains sodium or potassium hydrosulfide and sodium or potassium carbonate in admixture with other by-products in the following ratio, R:

$$R = \frac{2(S^0) + 3(S^{-2})}{\Sigma M}$$

where R has a value greater than 1 but less than 1.5 and

(S^0) = gram atoms sulfur with valence number zero/100 grams solution,

(S^{-2}) = gram atoms sulfur with valence number equal to -2/100 grams solution, and

ΣM = gram atoms of M/100 grams solution present in said aqueous effluent as MHS, M_2S, M_2S_x, M_2CO_3, $MHCO_3$, and MOH (M is either Na or K)

and thereafter

2. subjecting said effluent aqueous solution to flash decomposition in a flash decomposition zone under conditions effective to produce said regenerated aqueous solution having a value of R in the range of 0.75 to 1 inclusive.

4,008,311

COMPOSITION FOR CONTROLLING SEXUAL BEHAVIOR OF MAMMALS

Hiroomi Ono, Tokyo, Japan, assignor to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Mar. 14, 1975, Ser. No. 558,359

Claims priority, application Japan, Mar. 16, 1974, 49-30245

Int. Cl.² A61K *31/56*

U.S. Cl. 424—240 **2 Claims**

1. A method for causing loss of sexual desire and sexual activity in a male dog comprising administering to said dog an injectable composition containing (1) hexesterol dicaprylate and (2) testosterone enanthate in a weight ratio of (1) to (2) of 1:1-3 as active ingredients and a pharmaceutically acceptable liquid carrier in a dosage of 0.5–3.0 mg/kg body weight of the active ingredients.

4,008,312

PREGNANE-21-OIC ACID DERIVATIVES

Klaus Annen; Helmut Hofmeister; Henry Laurent; Klaus Kieslich; Hans Wendt, and Peter Klaus Mengel, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

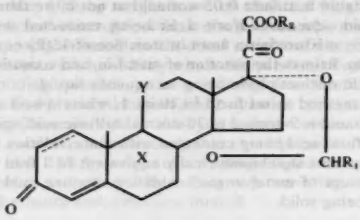
Filed Oct. 29, 1975, Ser. No. 626,775

Claims priority, application Germany, Oct. 31, 1974, 2451971

Int. Cl.² A61K *31/58*; C07J *1/00*

U.S. Cl. 424—241 **20 Claims**

1. Pregnane-21-oic acid derivatives of the formula



wherein

the linkage represents a single bond or a double bond;

X is hydrogen, fluorine or chlorine;

Y is methylene, hydroxymethylene, alkanoyloxymethylene, carbonyl, fluoromethylene or chloromethylene;

R_1 is hydrogen, alkyl of 1–6 carbon atoms, phenyl or naphthyl substituted with 0–3 lower alkyl, lower alkoxy or chlorine; and

R_2 represents a hydrogen atom, the carboxylic acid salt cation of a physiologically compatible base or the residue of a physiologically acceptable aliphatic or cycloaliphatic alcohol of 1–18 carbon atoms optionally substituted by a member selected from the group consisting of lower alkyl, cyclopentyl, cyclohexyl, hydroxy, lower alkoxy, free or esterified carboxyl and the sodium and potassium salts thereof, amino, mono- or di-lower alkylamino and the hydrochloride, hydrobromide, sulfate, phosphate, oxalate, maleate or tartrate salts thereof.

15. A compound according to claim 1, wherein R_1 is phenyl or naphthyl substituted by 0–3 of lower alkyl, lower alkoxy or halogen.

4,008,313

NOVEL CORTICOIDS

Henry Laurent; Rudolf Wiechert; Peter Klaus Mengel, all of Berlin, and Karl-Heinz Kolb, Hamburg, all of Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

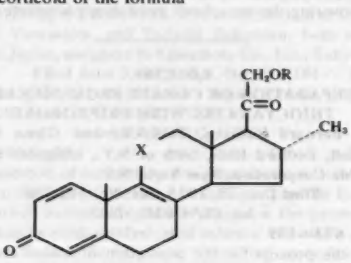
Filed Oct. 7, 1975, Ser. No. 620,411

Claims priority, application Germany, Oct. 9, 1974, 2448662

Int. Cl.² A61K *31/56*

U.S. Cl. 424—242 **13 Claims**

1. A corticoid of the formula



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wherein X is β-hydroxymethylene or carbonyl, and R is a hydrogen atom or alkanoyl of 1 to 12 carbon atoms.

13. A method for the treatment of inflammations of the skin which comprises topically administering to the affected skin an anti-inflammatorily effective amount of a compound of claim 1.

4,008,314

MANUFACTURE OF SOLID AMMONIUM PHOSPHATE

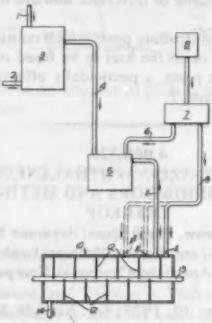
Eric Davidson, Edinburgh, Scotland, assignor to Scottish Agricultural Industries Limited, Edinburgh, Scotland

Filed Jan. 20, 1976, Ser. No. 650,755

Claims priority, application United Kingdom, Jan. 30, 1975, 4095/75

Int. Cl.² C01B *25/28*

U.S. Cl. 423—309 8 Claims



1. A process for the production of a particulate solid product comprising ammonium phosphate of N:P atomic ratio 0.95 to 1.10 wherein a primary phosphoric acid-containing feed and ammonia are added to an aqueous slurry of ammonium phosphate of flowable consistency at the temperature of working and having an N:P atomic ratio of between 1.3 and 1.5 to form more slurry of substantially the same composition and concentration and flowable consistency, removing an amount of said slurry substantially equivalent to that produced by the addition of the phosphoric acid and ammonia and thereafter mixing the removed slurry with a secondary acid feed to reduce the N:P ratio to 0.95 to 1.10, wherein the removed slurry is first mixed separately with between 15% and 85% by volume of the secondary acid feed, followed by the addition of the remainder of the secondary acid at a later stage, so that the ammonium phosphate of the resulting product has an N:P atomic ratio in the range 0.95 to 1.10, the water contents of the removed aqueous slurry and the secondary acid feed being such that the resulting product solidifies in a moisture disengagement unit where it is treated for a sufficient period of time for said product to be solid at ambient temperature.

4,008,315

PROCESS FOR REDUCING NITROGEN OXIDE LOSSES FROM CERTAIN SLURRIES AND SOLUTIONS BY THE ADDITION OF PHOSPHATE SALTS

Ernst-Helmut Philippi, Polsum; Helmut Pokorny, Gelsenkirchen, and Wolfgang Mumme, Oer-Erkenschwick, all of Germany, assignors to Veba-Chemie AG, Gelsenkirchen-Buer, Germany

Filed Jan. 2, 1973, Ser. No. 320,389

Claims priority, application Germany, Dec. 31, 1971, 2165807

Int. Cl.² C01B *25/16*

U.S. Cl. 423—319 5 Claims

1. A process for preventing nitrogen oxide loss from a liquid or slurry containing an oxide of nitrogen which comprises applying thereto salt solutions or suspensions of the phosphate of ammonium, the alkali metals and magnesium, individually or in mixtures, said salt solutions or suspensions being used in a concentration of at least 3% by weight and adjusted to a pH value of from 0.5 to 8.

4,008,316

APPARATUS FOR PRODUCING SO_3 AND SULPHURIC ACID BY A CATALYTIC OF GASES WHICH CONTAIN SO_2

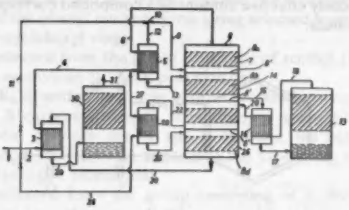
Herbert Drechsel; Karl-Heinz Dorr, and Hugo Grimm, all of Frankfurt am Main, Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 4,084, Jan. 19, 1970, which is a continuation of Ser. No. 768,958, Sept. 30, 1968, which is a continuation of Ser. No. 465,570, June 21, 1965. This application July 10, 1972, Ser. No. 270,396

Claims priority, application Germany, June 23, 1964, 61479; July 8, 1964, 61638

Int. Cl. C01B *17/72, 17/68, 17/70*

U.S. Cl. 423—533 28 Claims



1. In a process for the production of SO_3 by catalytic conversion of SO_2 which comprises:

passing a SO_2-containing feed gas through a first catalyst contacting stage for conversion of a part of the SO_2 to SO_3, the gas being heated by the conversion,

cooling the gas from the first catalyst stage and passing the cooled gas through an absorber for removal of SO_3 therefrom,

passing the gas from the absorber through a second catalyst contacting stage for conversion of SO_2 to SO_3, the gas being heated by the conversion, and recovering SO_3 produced in the second contacting stage,

the improvement which comprises the first stage including only two catalyst beds providing a first and second bed in the first stage, the gas being cooled between the beds of the first stage, the conversion in the first stage based on SO_2 content of the starting gas being about 70–90%, said cooling of the gas from the first stage being carried out by first passing the first stage effluent gas in indirect heat exchange relation with the absorber effluent gas, and then passing the first stage effluent gas in indirect heat exchange relation with another heat exchange medium for further cooling of the gas, the second stage comprising only two calalyst beds, the gas from the absorber being passed through the first bed and thereafter the second bed, the gas being cooled after passage through the first bed and before introduction into the second bed, with substantial reduction in catalyst required for the process.

4,008,317

VARICELLA-ZOSTER VIRUS VACCINE AND PREPARATION THEREOF

Jacqueline Gits, La Hulpe, Belgium, assignor to Recherche et Industrie Therapeutiques (R.I.T.), Belgium

Filed Dec. 29, 1975, Ser. No. 644,787

Int. Cl.² A61K *39/12*

U.S. Cl. 424—89 6 Claims

1. A live varicella zoster virus vaccine comprising an effective dose of a temperature sensitive N-methyl-N'-nitro-N-nitrosoguanidine induced mutant strain of a pathogenic varicella-zoster virus, said strain having a cut-off temperature of 37° C and being able to multiply in the dermic tissue of a susceptible organism but having inhibited replication in the internal organs, and a pharmaceutical diluent.

4,008,318

PHOSPHORYLATED THIOUREA FUNGICIDES

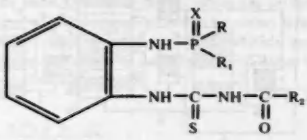
Alexander Mihailovski, Kensington, and Don R. Baker, Orinda, both of Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Continuation-in-part of Ser. No. 471,092, May 17, 1974, abandoned, which is a continuation of Ser. No. 335,415, Feb. 26, 1973, abandoned, which is a division of Ser. No. 336,110, Feb. 24, 1973, Pat. No. 3,847,980, which is a division of Ser. No. 213,714, Dec. 29, 1971, Pat. No. 3,767,734. This application Aug. 25, 1975, Ser. No. 607,516

Int. Cl.² A01N *9/36*

U.S. Cl. 424—211 **25 Claims**

1. A method of selectively controlling fungi selected from the group consisting of *Penicillium italicum* and *Erysiphe polygone* comprising contacting the habitat thereof with a fungicidally effective amount of a compound corresponding to the formula:



wherein X is selected from the group consisting of oxygen and sulfur, R and R_1 can be the same or different and are selected from the group consisting of lower alkyl having 1–4 carbon atoms and lower alkoxy having 1–4 carbon atoms, R_2 is selected from the group consisting of lower alkyl, lower alkoxy and lower thioalkyl each having from 1–4 carbon atoms.

4,008,319

O,S-DIALKYL O-BENZOYL-PHENYL PHOSPHOROTHIOLATES AND PHOSPHORODITHIOATES, PESTICIDAL COMPOSITIONS AND METHODS OF USE

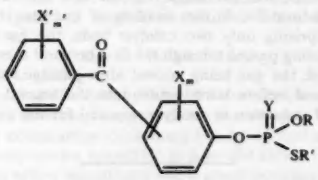
William S. Hurt, Collegeville, Pa., assignor to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 532,128, Dec. 12, 1974, abandoned. This application May 12, 1975, Ser. No. 576,837

Int. Cl.² A01N *9/36*; **C07C** *9/18*

U.S. Cl. 424—214 **19 Claims**

1. A compound of the formula:



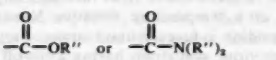
wherein

R is a (C_1–C_4) alkyl group;

R′ is a (C_3–C_6) alkyl group;

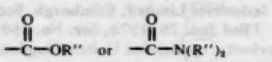
Y is an oxygen atom or a sulfur atom;

X is a halogen atom, a (C_1–C_5) alkyl group, a (C_1–C_5) alkoxy group, a trifluoromethyl group, a cyano group, or a group of the formula:



wherein R″ is a hydrogen atom or a (C_1–C_3) alkyl group;

X′ is a halogen atom, a nitro group, a (C_1–C_5) alkyl group, a (C_1–C_5) alkoxy group, a trifluoromethyl group, a cyano group, or a group of the formula:



wherein R″ is a hydrogen atom or a (C_1–C_3) alkyl group; and

m and *m′* are the same or different. and are integers from 0 to 3.

15. A method of controlling pests which comprises applying directly to the pests or to the loci to be freed of or protected from attack by such pests, a pesticidally effective amount of the compound of claim 1.

4,008,320

AMIDOPHENYL-AZO-NAPHTHALENESULFONIC COMPLEMENT INHIBITORS AND METHOD OF USE THEREOF

Ransom Brown Conrow, Pearl River; Seymour Bernstein, New City, both of N.Y., and Robert Herman Lenhard, Paramus, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Dec. 12, 1975, Ser. No. 640,369

Int. Cl.² C07C *107/06*, *107/07*

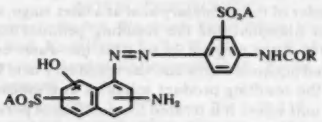
U.S. Cl. 424—226 **17 Claims**

1. A compound, 6-amino-4-hydroxy-5-(2-sulfo-4-p-sulfobenzamidophenylazo)-2-naphthalenesulfonic acid, trisodium salt.

2. A compound, 6-amino-4-hydroxy-5-(4-propionamido-2-sulfophenylazo)-2-naphthalenesulfonic acid, disodium salt.

3. A compound, 6-amino-4-hydroxy-5-[4-(p-nitrobenzamido)-2-sulfophenylazo]-2-naphthalenesulfonic acid, disodium salt.

4. A method of inhibiting the complement system in a body fluid which comprises subjecting said body fluid to the action of an effective complement inhibiting amount of a compound of the formula:



wherein R is selected from the group (C_1–C_6) alkyl, phenyl, sulfophenyl sodium salt, p-nitrophenyl and m-fluorophenyl; and A is hydrogen, sodium and potassium, with the proviso that A is identical in the same compound.

4,008,321

COMPOSITION FOR A TOPICAL PREPARATION AND A PROCESS FOR PRODUCING THE SAME

Takuzo Kamishita, and Shigeyoshi Hiraki, both of Toyama, Japan, assignors to Toko Yakuhin Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Dec. 8, 1975, Ser. No. 638,916

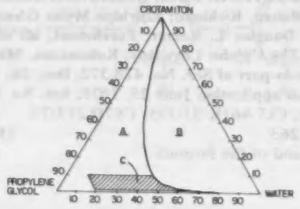
Claims priority, application Japan, Dec. 20, 1974, 49-147110

Int. Cl.² A61K *31/56*

U.S. Cl. 424—243 **10 Claims**

1. A transparent, gelatinous topical composition which comprises a steroid selected from the group consisting of prednisolone, dexamethasone, triamcinolone, β-methasone and cortisone; crotamiton, propylene glycol and a carboxyvinyl polymer in an aqueous medium, said composition having been neutralized with an organic amine selected from the group consisting of alkylamines and alkanolamines, and containing crotamiton in an amount of from 0.5 to 10% by weight,

propylene glycol in an amount of from 20 to 80% by weight, water in an amount of from 10 to 80% by weight and carboxyvinyl polymer in an amount of from 0.3 to 1.5% by weight of the composition.

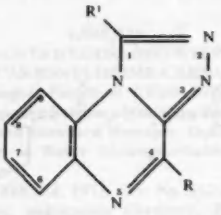


4,008,322
TRIAZOLO(4,3-A)QUINOXALINES FOR CONTROL OF RICE

Barry A. Dreikorn, and Thomas D. Thibault, both of Indianapolis, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed June 10, 1975, Ser. No. 585,534
Int. Cl.² A01N 9/22
U.S. Cl. 424—250 **6 Claims**

1. A method of reducing the adverse effects of rice blast which comprises contacting *Piricularia oryzae* on the foliage of rice with an effective Piricularia-inhibiting amount of a compound of the formula



wherein

R represents chloro, amino, hydrazino or hydrogen;

R^1 represents methyl or hydrogen; and

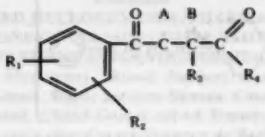
provided that at least one of R and R^1 represents hydrogen.

4,008,323
METHOD OF REDUCING CHOLESTEROL USING CERTAIN AROMATIC KETO ACIDS

Henri Cousse; Gilbert Mouzin; Jean-Pierre Rieu, and Andre Delhon, all of Castres, France, assignors to Pierre Fabre S.A., Paris, France

Filed Mar. 21, 1975, Ser. No. 560,344
Claims priority, application France, Mar. 25, 1974, 74.10196; Feb. 17, 1975, 75.04912
Int. Cl.² A61K 31/495, 31/235, 31/205, 31/19
U.S. Cl. 424—250 **14 Claims**

1. A method of reducing blood cholesterol which comprises administering to a living animal body in need of blood cholesterol reduction an effective cholesterol reducing amount of a compound of the following formula:



wherein

R_1 is selected from the group consisting of hydrogen, halogen, phenyl, ortho-halophenyl, and phenoxy,

R_2 is selected from the group consisting of hydrogen and methoxy,

or wherein R_1 and R_2 taken, together with carbon atoms from the phenyl nucleus, form a ring selected from phenyl and cyclohexyl rings,

R_3 is selected from the group consisting of methyl (CH_3—) and methylene (CH_2=), provided that:

when R_3 is methyl, a double bond is present between the A and B carbons; when R_3 is methylene, a single bond is present between the A and B carbons; the remaining valences of the A carbon atom in any case being satisfied by hydrogen atoms, and

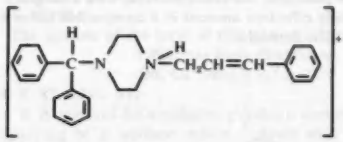
R_4 is selected from the group consisting of hydroxy and alkoxy or a pharmaceutically acceptable salt thereof.

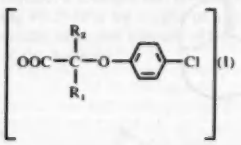
4,008,324
PHENOXYALKYLCARBOXYLIC ACID SALT OF 1-CINNAMYL-4-DIPHENYLMETHYL PIPERAZINE, METHOD OF PREPARATION AND ANTIHYPERCHOLESTEREMIC

Gunter Metz, Blaubeuren, and Manfred Specker, Ehingen (Danube), both of Germany, assignors to Ludwig Merckle KG, Blaubeuren, Germany

Filed Jan. 20, 1976, Ser. No. 651,284
Claims priority, application Germany, Jan. 23, 1975, 2502679
Int. Cl.² C07D 295/00; A61K 31/495
U.S. Cl. 424—250 **3 Claims**

1. Phenoxyalkylcarboxylic acid derivatives of 1-cinnamyl-4-diphenylmethylpiperazine (cinnarizine) having the general formula:





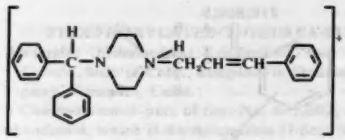
(I)

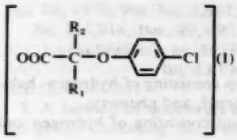
wherein

R_1 is a hydrogen atom, an alkyl group of from 1 to 4 carbon atoms or a p-chlorophenoxy group, and

R_2 is a hydrogen atom or an alkyl group of from 1 to 4 carbon atoms.

3. Medicament, which comprises an antihypercholesteremic amount of one or more compounds of the formula:





wherein

R_1 is a hydrogen atom, an alkyl group of from 1 to 4 carbon atoms or a p-chlorophenoxy group, and

R_2 is a hydrogen atom or an alkyl group of from 1 to 4 carbon atoms

together with pharmaceutical acceptable carriers or adjuvants.

4,008,325

CONTROL OF RICE BLAST DISEASE EMPLOYING CERTAIN PYRIDO COMPOUNDS

Robert J. Bass, Birchington, England; Richard C. Koch, Niantic, Conn.; Hugh C. Richards, and John E. Thorpe, both of Canterbury, England, assignors to Pfizer Inc., New York, N.Y.

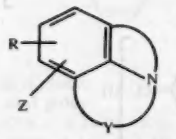
Division of Ser. No. 361,200, May 17, 1973, Pat. No. 3,917,838. This application July 25, 1975, Ser. No. 598,747

Claims priority, application United Kingdom, May 17, 1972, 23158/72

Int. Cl.² A01N 9/22

U.S. Cl. 424—258 **3 Claims**

1. A method for the control of fungal diseases of rice plants and disease thereof caused by Xanthomonas oryzae comprising contacting the plants, or the seeds thereof, with a fungicidally or bactericidally effective amount in a compatible diluent of a compound of the formula



or a non-phytotoxic acid addition salt thereof;

wherein each of X and Y completes a saturated or unsaturated pyrido ring;

X and Y are each unsubstituted or substituted with up to two substituents which are halo, lower alkyl, phenyl, oxo or thio;

R is hydrogen, lower alkyl, lower alkoxy, lower alkanoyl, benzoyl, hydroxy, lower alkanoyloxy, cyano, or halo; and

Z is hydrogen or halo.

4,008,326

SUBSTITUTED UREAS AND THIOUREAS AND PHARMACEUTICAL COMPOSITIONS THEREOF

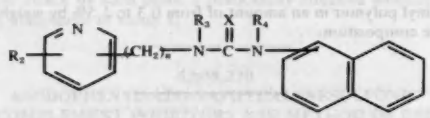
William A. Callahan, Richland; Eldridge Myles Glenn, Kalamazoo, and Douglas L. Rector, Parchment, all of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 428,372, Dec. 26, 1973, abandoned. This application June 25, 1975, Ser. No. 590,272

Int. Cl.² A61K 31/395; C07D 213/75

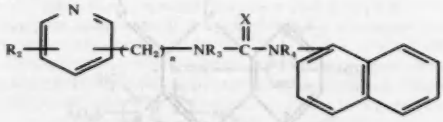
U.S. Cl. 424—263 **15 Claims**

1. A compound of the formula



and pharmaceutically acceptable acid addition salts thereof wherein R_2 is hydrogen, alkyl of one to four carbon atoms, inclusive, or halogen; R_3 and R_4 are the same or different and are hydrogen or alkyl of one to four carbon atoms, inclusive; X is oxygen or sulfur; and n is one or two; provided that when R_2 and R_4 are hydrogen and X is sulfur, then R_3 is hydrogen and further provided that when R_2 is hydrogen or halogen, R_4 is hydrogen and X is oxygen, then R_3 is alkyl of one to four carbon atoms, inclusive, and still further provided that when a 2-naphthyl is present, the pyridyl ring is other than the four position.

14. A pharmaceutical dosage unit form, useful for increasing the production of endogenous prostaglandin F_2 by a mammal, which comprises an amount of a compound which is effective to increase the production of engodenous prostaglandin F_2 selected from the formula:



pyridyl N-oxides thereof and pharmaceutically acceptable acid addition salts thereof wherein R_2 is hydrogen, alkyl of one to four carbon atoms, inclusive, or halogen; R_3 and R_4 are the same or different and are hydrogen or alkyl of one to four carbon atoms, inclusive; X is oxygen or sulfur; and n is one or two; provided that when R_2 and R_4 are hydrogen and X is sulfur, then R_3 is hydrogen, and further provided that when R_2 is hydrogen or halogen, R_4 is hydrogen and X is oxygen, then R_3 is alkyl of one to four carbon atoms, inclusive, and still further provided that when a 2-naphthyl is present the pyridyl ring is other than the four position in association with a pharmaceutical carrier suitable for systemic administration.

4,008,327

TOLYLOXYPIVALOPHENONE DERIVATIVES

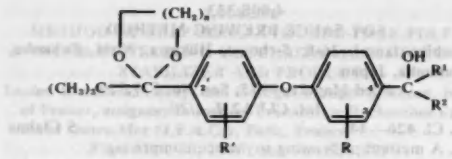
Faizulla G. Kathawala, West Orange, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Filed June 16, 1975, Ser. No. 587,345

Int. Cl.² A61K 31/335

U.S. Cl. 424—278 **16 Claims**

1. A compound which is an acetal of the formula



wherein each of

R and R′ is, independently, a hydrogen atom, alkyl having from 1 to 4 carbons, or a halogen atom having an atomic weight of from about 19 to 36;

R^1 is alkyl having from 1 to 24 carbon atoms;

R^2 is a hydrogen atom or alkyl having from 1 to 4 carbon atoms; and

n is 1

provided that when any of R is at the 3-position, or R′ is at the 2′-position, such substituent is not branched chain alkyl.

10. A pharmaceutical composition useful in treating diabetes comprising an anti-diabetic effective amount of a compound of claim **1**, and a pharmaceutically acceptable carrier.

13. A method of treating diabetes in a mammal, comprising administering to a mammal in need of such treatment, an amount of a compound of claim **1**, effective in reducing the level of glucose in the blood of said mammal.

4,008,328

N-METHYL-N-(3-TRIFLUOROMETHYLPHENYLSULFENYL)-CARBONYLOXIME-CARBAMATES

Peter Siegle, Cologne; Engelbert Kühle, Bergisch-Gladbach; Ingeborg Hammann, Cologne; Wolfgang Behrenz, Overath-Steinenbruck, and Bernhard Homeyer, Opladen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

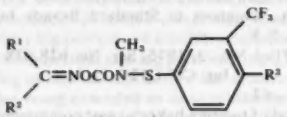
Filed Feb. 24, 1975, Ser. No. 552,502

Claims priority, application Germany, Feb. 27, 1974, 2409463

Int. Cl.² A01N *9/00*; **C07C** *83/08*

U.S. Cl. 424—298 **8 Claims**

1. An N-sulfenylated oxime-carbamate of the formula



in which

R^1 and R^2 each independently is hydrogen, alkyl, alkenyl, alkynyl, alkoxy, alkylthio, alkoxycarbonyl, aminocarbonyl or alkylthioalkyl,

R^3 is hydrogen or halogen.

6. An insecticidal, acaricidal, nematicidal, fungicidal or bactericidal composition containing as active ingredient an insecticidally, acaricidally, nematicidally, fungicidally or bactericidally effective amount of a compound according to claim **1** in admixture with a diluent.

4,008,329

SUBSTITUTED CYCLOHEXANES, PHARMACEUTICAL COMPOSITIONS CONTAINING THEM AND METHOD OF TREATMENT INVOLVING THEIR USE

Roland-Yves Mauvernay, Riom; Norbert Busch, Manzat; Jacques Moleyre, Riom; Jacques Simons, Chamalieres, and André Monteil, Chatel-Guyon, all of France, assignors to Societe Anonyme dite: Centre Europen de Recherches Mauvernay (C.E.R.M.), Riom, France

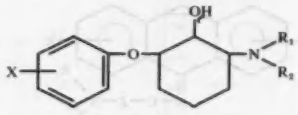
Filed Aug. 4, 1975, Ser. No. 601,864

Claims priority, application France, Aug. 5, 1974, 74.27168

Int. Cl.² A01N *9/20*

U.S. Cl. 424—330 **13 Claims**

1. Compounds of the general formula:



II

in which X represents a halogen atom at the 3- or 4-position of the phenoxy group or a $-CF_3$ group at the 3- position of the phenoxy group and R_1 and R_2 both represent hydrogen, both represent lower alkyl or one represents hydrogen and the other represents an isopropyl, sec-butyl, n-butyl, isoamyl or 2-phenylisopropyl group, and pharmaceutically acceptable acid addition salts thereof.

9. A pharmaceutical composition for use as an antidepressant-psychotonic comprising a compound according to claim **1** in an amount of 50 to 100 mg. per dose as the active ingredient together with a pharmaceutically acceptable carrier which includes lactose, the amount of said carrier being greater than the amount of said active ingredient.

4,008,330

METHOD FOR COMBATTING RODENTS AND RODENTICIDAL COMPOSITIONS

Hiroshi Yamamoto, Tokyo; Shoichi Kato, Ageo; Koji Ohgushi, and Iwao Tokumitsu, both of Fukuoka, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 286,058, Sept. 5, 1972, Pat. No. 3,892,864. This application Mar. 25, 1975, Ser. No. 561,980

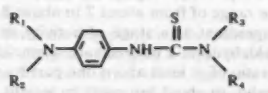
Claims priority, application Japan, Sept. 13, 1971, 46-70390

The portion of the term of this patent subsequent to July 1, 1992, has been disclaimed.

Int. Cl.² A01N *9/12*, *9/20*

U.S. Cl. 424—322 **5 Claims**

1. A method for combatting rodents comprising the step of applying to a surface which rodents may be expected to contact a rodenticidal powder other than a feed bait comprising 99.5–10% by weight of a suitable adjuvant and a rodenticidally effective amount of 0.5–90% by weight of a compound of the formula.



wherein R_1 is hydrogen or alkyl of 1 to 5 carbons, R_2 is alkyl of 1 to 5 carbons, R_3 is hydrogen or alkyl of 1 to 2 carbons, and R_4 is hydrogen or alkyl of 1 to 12 carbons, or a hydrochloric acid salt thereof.

4,008,331

ANTIDEPRESSANT 1,1a,6,10B-TETRAHYDRODIBENZO-[a,e]-CYCLOPROPA-[c]-CYCLOHEPTEN-6-SUBSTITUTED OXIMES

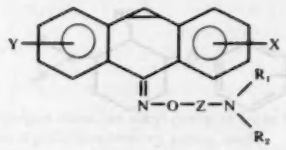
Roy Teruyuki Uyeda, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 616,483, Sept. 26, 1975, Pat. No. 3,960,956, which is a continuation-in-part of Ser. No. 525,877, Nov. 21, 1974, abandoned. This application Mar. 15, 1976, Ser. No. 667,274

Int. Cl.² A61K *31/155*

U.S. Cl. 424—327 12 Claims

7. A method of alleviating depression in a mammal which comprises administering to the mammal an effective antidepressant amount of a compound of the formula:



where

X or Y = H, F, Cl, Br, C_1–C_4 alkyl, C_1–C_4 alkoxy, CF_3, CH_3S, CH_3So_2, $SO_2N(CH_3)_2$, provided that one is H;

Z = C_2–C_3 alkylene;

R_1 and R_2 independently = H or C_1–C_4 alkyl; and its pharmaceutically suitable salts.

4,008,332

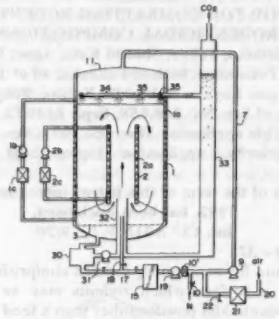
MICROCIDE

Richard Dean Thomas, 812 N. Euclid St., Fullerton, Calif. 92632

Continuation of Ser. No. 658,359, Aug. 4, 1967, abandoned. This application Dec. 23, 1969, Ser. No. 884,771

Int. Cl.² A61K *31/115*; A61L *13/02*

U.S. Cl. 424—334 9 Claims



1. A microcidal solution for the release of formaldehyde on surfaces to be disinfected comprising water, 2-hydroxymethyl-2-nitro-1,3-propanediol as an active ingredient for releasing formaldehyde, a pH adjusting agent to adjust the pH of the solution in the range of from about 7 to about 8.0 to maintain said active ingredient at a stage of activity at which it will release formaldehyde at a desired rate, formaldehyde in said solution in a ratio of at least about one part by weight, calculated as formalin, to about ten parts by weight of said active ingredient to prevent premature decomposition of said active ingredient prior to the application of the solution to said surfaces, and a hygroscopic material in an amount sufficient to pull in adequate moisture to allow substantially complete decomposition of the said active ingredient on said surfaces.

4,008,333

SOY SAUCE BREWING METHOD

Masahiko Izumi, 26-8, 5-chome, Hiikawa, Nishi, Fukuoka, Fukuoka, Japan

Filed May 21, 1975, Ser. No. 579,729

Int. Cl.² A23L *1/20*

U.S. Cl. 426—44 5 Claims

1. A method of brewing soy sauce comprising

charging soy sauce moromi to a closed type large capacity tank provided with a hollow internally disposed cylinder for moromi circulation,

feeding an inert gas at the bottom of the cylinder including a necessary minimum amount of oxygen at 25° C to 35° C through the moromi thereby promoting circulation,

pumping the inert gas to effect recirculation thereof from the top of said tank to the bottom of the cylinder thus creating a reduced pressure at the upper portion of the tank;

withdrawing a part of the moromi from the bottom of the tank,

discharging inert gas and carbon dioxide produced by fermentation from said withdrawn moromi in a gas-liquid separating tower, and

re-circulating the degased moromi to the upper part of the tank at the periphery thereof.

4,008,334

PROCESS FOR REMOVAL OF WATER-SOLUBLE CARBOHYDRATES IN THE PRODUCTION OF PLANT PROTEIN PRODUCTS

Ole Kaae Hansen, Aarhus, Denmark, assignor to Aarhus Oliefabrik A/S, Aarhus, Denmark

Filed June 3, 1975, Ser. No. 583,164

Claims priority, application United Kingdom, June 5, 1974, 24845/74

Int. Cl.² A23L *1/20*

U.S. Cl. 426—46 13 Claims

1. Process for removal of water-soluble carbohydrates in the production of plant protein products in which an aqueous solution or dispersion of the carbohydrate-containing material containing 1–60% dry matter is inoculated with a microorganism selected from the genus Saccharomyces and having the ability to degrade and assimilate flatus-causing carbohydrates and fermented for from 12 to 48 hours at a temperature of 20° to 40° C and at a pH of from 4 to 7 to remove substantially all water-soluble carbohydrates.

4,008,335

METHOD OF TREATING BAKER'S YEAST

Emanuel Akerman, Bronx, N.Y., and Seymour Pomper, Stamford, Conn., assignors to Standard Brands Incorporated, New York, N.Y.

Filed Nov. 3, 1975, Ser. No. 628,038

Int. Cl.² C12C *11/16*

U.S. Cl. 426—62 9 Claims

1. A method of treating baker's yeast comprising treating an aqueous suspension of said yeast with a sufficient amount of an acid to lower the pH of the suspension to a range of from about 0.9 to about 2 under conditions whereby the initial leavening activity of the yeast when added to sweet dough is not substantially detrimentally affected and incorporating into the acid treated yeast suspension a sufficient amount of a neutralizing agent to raise the pH of the suspension to the range of from about 2.5 to about 6, the major portion of the neutralizing agent being composed of a material which is a source of ammonium ions, thereby improving the filterability of the yeast suspension.

4,008,336

METHOD OF PREPARING AVOCADO-PEAR PULP POWDER CONTAINING CUCURBITA MOSCATO AS A STABILIZER AND PRODUCT

Lucien Haendler, Clichy, and Georges Mangeot, Macon, both of France, assignors to Institut Francais de Recherches Fruitieres Outre-Mer (I.F.A.C.), Paris, France

Filed Mar. 10, 1975, Ser. No. 556,979

Claims priority, application France, Mar. 14, 1974, 74.08769

Int. Cl.[2] A23D *4/00*

U.S. Cl. 426—270 8 Claims

1. In a method of preparing a dry powder from avocado-pear pulp the improvement which comprises mixing from 1 to 25% by weight of cucurbita moscata with said avocado-pear pulp to form a homogeneous paste and then converting said paste to a dry powder.

4,008,337

METHOD OF INJECTING POULTRY IN THE THIGH AND LEG PORTIONS WITHOUT PENETRATING THE SKIN

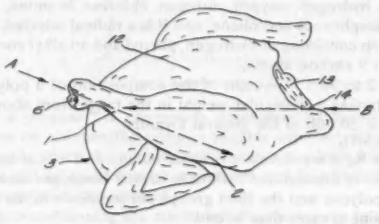
Arnold A. Bladow, Detroit Lakes, Minn., and Francis E. Ramsey, Shell Knob, Mo., assignors to Swift and Company Limited, Chicago, Ill.

Filed June 24, 1974, Ser. No. 481,989

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.[2] A23L *1/315*

U.S. Cl. 426—281 3 Claims



1. A method for internally introducing an additive material into at least one of the interconnected thigh and leg portions of a poultry carcass, said method comprising: severing the feet from the poultry leg portions of a poultry carcass and pulling a number of tendons from said leg portions; engaging and fully extending a leg of said carcass before the attainment of rigor mortis, said leg being extended so as to substantially align the femur and fibular bones at a minimum angle to the back of the carcass; inserting a single long multiple orifice needle into an empty tendon sheath from which a tendon has been pulled and advancing said needle through said sheath and beneath the poultry skin substantially parallel to said fibula and through the flesh of said leg, across the joint between said fibula and femur and substantially through the length of the flesh portion of said thigh and substantially parallel to said femur without penetrating the skin of said thigh and leg portions; and introducing an additive under pressure through said needle orifices into the flesh of at least one of said interconnected thigh and leg portions.

4,008,338

METHOD FOR INJECTING A LIQUID ADDITIVE INTO POULTRY FLESH WITHOUT PENETRATING THE SKIN

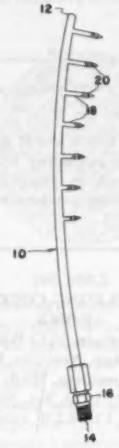
Eldon J. Strandine, Chicago, and Carl H. Koonz, Northbrook, both of Ill., assignors to Swift and Company Limited, Chicago, Ill.

Filed Aug. 1, 1974, Ser. No. 493,686

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.[2] A23L *1/315*

U.S. Cl. 426—281 4 Claims



1. A method for injecting an additive material into the flesh of a poultry carcass, said method comprising: inserting a comb-like injector instrument between the flesh and the skin by pulling the skin away from the flesh at a point where the skin is cut open from the flesh and advancing said instrument along a portion of the carcass, said injector instrument having a hollow manifold portion and a plurality of hollow tines extending perpendicular thereto in a plane along said manifold, and said instrument being first held with the tines substantially parallel to the surface of said flesh; turning said injector instrument to point said tines into said flesh whereby the skin is stretched from said flesh; embedding said plurality of tines into said flesh without penetrating the skin and until said manifold rests against the surface thereof; and introducing an additive under pressure through said hollow manifold and through said tines and into said flesh while the tines are embedded therein.

4,008,339

PROCESS FOR REMOVING POLYPHENOLS IN VEGETABLE BEVERAGES

Shogo Matsuda; Tomio Kuriki; Kazuto Ohue, and Kunihiko Okajima, all of Osaka, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Dec. 24, 1975, Ser. No. 644,339

Claims priority, application Japan, Dec. 28, 1974, 50-149174

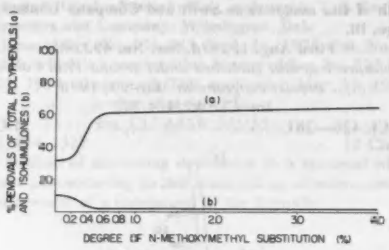
Int. Cl.[2] C12H *1/04*

U.S. Cl. 426—330.4 7 Claims

1. A process for removing polyphenols present in vegetable beverages which comprises bringing a vegetable beverage into contact with an adsorbent material in the form of finely divided porous powders or flakes, said adsorbent material consisting essentially of a polyamide containing recurring anide groups as an integral part of the main polymer chain or a mixture of polyamides containing recurring amide groups as an integral part of the main polymer chain in which 0.5% to 65% in number of the hydrogen atoms linked to the nitrogen

atoms of the amide linkages in the main chain are substituted with substituents represented by the formula

$-(CH_2)_n-R$



where n is an integer of 1 to 4 and R is at least one member selected from the group consisting of a hydrogen atom, a hydroxyl group and an alkoxy group having 1 to 4 carbon atoms and Rs in the molecule are the same as or different from each other.

4,008,340

METHOD FOR STABILIZING COFFEE GRINDER GAS AROMA

Jo-Fen T. Kung, North Bergen, N.J.; William P. Clinton, Monsey, and Robert J. Soukup, New City, both of N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Filed May 21, 1973, Ser. No. 362,603
Int. Cl.² A23F *1/04*
U.S. Cl. 426—651 **11 Claims**

1. A method of stabilizing coffee grinder gas aroma comprising the steps of:
   a. disrupting the cellular structure of freshly roasted coffee beans,
   b. condensing the evolved gas as a frost, at a temperature below −80° C,
   c. combining the condensed frost with powdered ascorbic acid or salts thereof in an amount between about 3 and 10% by weight of the condensate, thereafter
   d. permitting the frost to warm to a fluid consistency,
   e. briefly contacting the fluid condensate with a fluorinated hydrocarbon liquid in order to enable the liquid to extract the green tobaccoy and phenolic notes and thereafter
   f. separating the fluorinated-chlorinated hydrocarbon liquid from the condensate,
   g. thereafter, contacting the condensate with a mixed non-polar-polar solvent, containing 70 to 90% non-polar liquid on a volume basis, and at a level of at least 5 ml of the solvent mixture for each 100 grams of the grinder gas condensate, in order to permit the non-polar solvent to absorb most of the condensed aromatics, and then
   h. separating the condensated residue as an aqueous phase from the lighter, stabilized, aroma-containing solvent phase.

4,008,341

CURABLE LIQUID POLYMER COMPOSITIONS

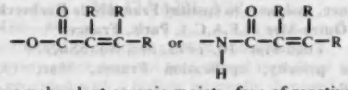
Clifton L. Kehr, Silver Spring, Md., assignor to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. Nos. 92,200, Nov. 23, 1970, and Ser. No. 92,311, Nov. 23, 1970, and Ser. No. 470,091, May 15, 1974, which is a continuation-in-part of Ser. No. 92,309, Nov. 23, 1970, abandoned, which is a continuation-in-part of Ser. No. 766,948, Oct. 11, 1968, Pat. No. 3,623,879. This application Jan. 10, 1975, Ser. No. 540,057
Int. Cl.² B05D *3/06*
U.S. Cl. 427—44 **19 Claims**

1. A composition curable in the presence of a free radical generating agent comprising:
   I. 98 to 2% by weight of the composition of a liquid polyene component of the formula

$[A]-(X)_m$

wherein m is an integer of at least 2, X is



and A is a polyvalent organic moiety, free of reactive carbon to carbon unsaturation and of highly water-sensitive members and consisting of atoms selected from the group consisting of carbon, hydrogen, oxygen, nitrogen, chlorine, bromine, fluorine, phosphorous and silicon; and R is a radical selected from the group consisting of hydrogen, phenyl and an alkyl containing 1 to 9 carbon atoms; and,
   II. 2 to 98% by weight of the composition of a polythiol having a molecular weight in the range from about 95 to 20,000 of the general formula:

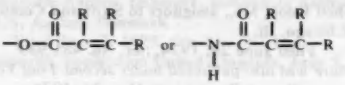
$R_n(SH)_n$

wherein R_n is a polyvalent organic moiety and n is at least 2, the reactive unsaturated carbon to carbon bonds per molecule in the polyene and the thiol groups per molecule in the polythiol being greater than 4.

6. A process of forming a solid cured polythioether wich comprises
   1. admixing a composition comprising:
      I. 98 to 2% by weight of the composition of a liquid polyene component of the formula

$[A]-(X)_m$

wherein m is an integer of at least 2, X is



and A is a polyvalent organic moiety free of reactive carbon to carbon unsaturation and of highly water-sensitive members and consisting of atoms selected from the group consisting of carbon, hydrogen, oxygen, nitrogen, chlorine, bromine, fluorine, phosphorous and silicon; and R is a radical selected from the group consisting of hydrogen, phenyl and an alkyl containing 1 to 9 carbon atoms;
      II. 2 to 98% by weight of the composition of a polythiol having a molecular weight in the range from about 94 to 20,000 of the general formula:

$R_n(SH)_n$

wherein R_n is a polyvalent organic moiety and n is at least 2, the reactive unsaturated carbon to carbon bonds per molecule in the polyene and the thiol groups per molecule in the polythiol being greater than 4, and
   2. exposing the mixture to a free radical generating agent.

4,008,342

WOOD TREATMENT WITH AMMONIACAL LIQUOR AND CARBON DIOXIDE

Neil George Richardson, Montreal, Canada, assignor to Domtar Limited, Montreal, Canada

Filed May 1, 1975, Ser. No. 573,557
Int. Cl.² B05D *3/00*
U.S. Cl. 427—297 **10 Claims**

1. A method of treating wood with an aqueous ammoniacal treating liquor wherein ammoniacal chemical serves to solubilize a water-insoluble wood treating chemical, comprising charging the wood to be treated into a pressure vessel, submerging the wood in said ammoniacal treating liquor, maintaining an elevated pressure in said vessel thereby to impregnate said wood with a requisite amount of said liquor, releasing said pressure, withdrawing excess of said liquor from said vessel, some of said liquor remaining on surface of said wood,

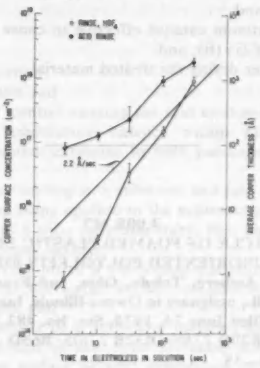
subjecting said wood to an atmosphere containing carbon dioxide in an amount and for a time sufficient for said carbon dioxide to combine with the ammonia in said liquor remaining on said surface to form a member of the group consisting of ammonium carbonate and ammonium bicarbonate in an amount sufficient to substantially prohibit subsequent deposition of said treating chemical until substantially all of said liquor on said surface of said wood has disappeared.

4,008,343

PROCESS FOR ELECTROLESS PLATING USING COLLOID SENSITIZATION AND ACID RINSE

Richard Lewis Cohen, Berkeley Heights, N.J., and Ronald Lee Meek, Naperville, Ill., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 15, 1975, Ser. No. 605,068
Int. Cl.² B05D 3/10
U.S. Cl. 427—305 10 Claims



1. A process for electroless deposition of metallic substances on nonmetallic surfaces suitable for electroless metal plating in which the metallic substances are selected from the group consisting of copper and nickel and in which the process comprises the steps of

a. preconditioning the nonmetallic surface so as to prepare the surface for a colloidal catalyst solution;

b. exposing the preconditioned surface to a colloidal catalyst solution consisting essentially of an aqueous solution of tin and palladium ions so as to produce a catalytically prepared surface containing catalyst;

c. rinsing the catalytically prepared surface;

d. exposing the catalytically prepared surface to an electroless plating solution so as to electrolessly plate the metallic substance on the catalytically prepared surface wherein the improvement lies in the rinsing of the catalytically prepared surface which is carried out using an aqueous acid solution with pH less than 1.5, said aqueous acid solution consisting essentially of water and an acid selected from the group consisting of hydrochloric acid, perchloric acid and nitric acid, and this rinsing step is carried out immediately after application of the colloidal catalyst solution without exposing the surface to an aqueous solution with pH greater than 1.5 and in addition is carried out under conditions which insures that the catalyst substantially remains on the surface.

4,008,344

MULTI-COMPONENT FIBER, THE METHOD FOR MAKING SAID AND POLYURETHANE MATRIX SHEETS FORMED FROM SAID

Miyoshi Okamoto, Takatsuki; Koji Watanabe, Otsu; Zenji Izumi; Toshihiko Aya, both of Nagoya, and Hideaki Kitagawa, Otsu, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Continuation of Ser. No. 457,542, April 3, 1974, abandoned.
This application Nov. 28, 1975, Ser. No. 636,063
Claims priority, application Japan, Apr. 5, 1973, 48-38218
Int. Cl.² B05D 3/10; D01F 8/10, 8/14; D04H 3/12
U.S. Cl. 427—307 11 Claims

1. In a method of making a sheet-like material comprising bundles of fiber forming synthetic polyester fine fibers and a polyurethane binder, the steps which comprise (1) spinning a plurality of multi-component fibers comprising (A) a fiber forming synthetic polyester and (B) a component removable by dissolution in a solvent which does not dissolve the fine fibers comprising component (A), wherein said component (B) comprises substantially a copolymer of styrene and about 10 – 30% by weight of a higher alcohol ester of an acid selected from the group consisting of acrylic acid and methacrylic acid, said higher alcohol containing 6 – 20 carbon atoms and having a boiling point of at least 150° C at 760 mm Hg, (2) making a primary sheet material from said multi-component fibers, (3) impregnating said primary sheet material with a water soluble sizing agent, (4) dissolving out component (B) to make an intermediate sheet material comprising bundles of fiber forming synthetic polyester fine fibers and the water soluble sizing agent, (5) combining said bundles with a polyurethane binder, and (6) removing said water soluble sizing agent.

3. A multi-component fiber comprising at least two components (A) and (B) as defined hereinafter, wherein component (B) is removable by dissolution in a solvent, wherein component (A) consists essentially of fine fibers which are not dissolved by said solvent, wherein said component (B) comprises substantially a copolymer of styrene and about 10 – 30% by weight of a higher alcohol ester of an acid selected from the group consisting of acrylic acid and methacrylic acid, said higher alcohol containing 6 – 20 carbon atoms and having a boiling point of at least 150° C at 760 mm Hg, and wherein said component (A) comprises substantially a fiber forming synthetic polyester.

10. A method of making a multi-component fiber comprising at least two components (A) and (B), wherein component (B) is removable by dissolution in a solvent therefrom, wherein component (A) consists essentially of fine fibers which are not dissolved by said solvent, wherein said component (B) comprises mainly a copolymer of styrene and about 10 – 30% by weight of a higher alcohol ester of an acid selected from the group consisting of acrylic acid and methacrylic acid, the alcohol containing 6 – 20 carbon atoms and having a boiling point of at least 150° C at 760 mm Hg, and wherein said other component (A) comprises mainly a fiber forming synthetic polyester, the steps which comprise spinning said components into a multi-component fiber and drawing the fiber at least 2.6 times at a drawing temperature not more than about 100° C.

4,008,345

PROCESS FOR FIRE-PROOFING TREATMENT OF SHAPED ARTICLES OF AROMATIC POLYAMIDES

Yoshihiko Imanaka, Hino, and Hiroshi Uchiyama, Matsuyama, both of Japan, assignors to Teijin Limited, Osaka, Japan

Filed Sept. 24, 1974, Ser. No. 508,907

Claims priority, application Japan, Oct. 5, 1973, 48-112115; Nov. 26, 1973, 48-131627; Feb. 25, 1974, 49-21371

Int. Cl.² B05D *3/02*

U.S. Cl. 427—381 **7 Claims**

1. In a process for fire-proofing treatment of shaped articles of aromatic polyamides by contacting a shaped article of an aromatic polyamide with an aqueous solution of a phosphorus-containing inorganic compound free from halogen and sulfur, drying it and then post heat-treating it; the improvement which comprises contacting said shaped article with an aqueous solution of a halogen- and sulfur-free, phosphorus-containing inoranic acid or an ammonium, amine or urea salt thereof as a treating agent, said treating agent being selected from the group consisting of ortho-phosphoric acid, phosphorous acid, polyphosphoric acid, pyrophosphoric acid, hypophosphorous acid, ammonium dihydrogen orthophosphate, ammonium hydrogen phosphite, ammonium polyphosphate, ortho-phosphoric acid dihydrogen dimethylamine salt, orthophosphoric acid dihydrogen n-butylamine salt, ortho-phosphoric acid dihydrogen hexamethylene diamine salt, phosphorous acid dihydrogen aniline salt, polyphosphoric acid dimethylamine salt, urea ortho-phosphate and urea phosphite in a concentration of about 2% to about 30% by weight, drying said treated shaped article at a temperature of not more than about 150° C. and then post heat-treating said shaped article at a temperature of about 300° C. to about 450° C. in air or in an atmosphere of an inert gas.

4,008,346

PROCESS FOR PREPARING A POLYSILOXANE

Richard E. Moeller, Troy, N.Y., assignor to General Electric Company, Waterford, N.Y.

Filed Dec. 18, 1974, Ser. No. 533,958

Int. Cl.² B05D *3/02*

U.S. Cl. 427—387 **9 Claims**

1. A process for rendering flexible sheet material non-adherent to surfaces which normally adhere thereto which process consists essentially of:

a. treating the sheet material with an aqueous emulsion containing:

i. a neutralized polysiloxane emulsion produced by the process comprising:

1. homogenizing a mixture which consists essentially of:

A. a compound of the formula $(R_2SiO)_4$ wherein R is a monovalent hydrocarbon free of unsaturation;

B. a compound of the formula:

$(RR^1SiO)_4$

wherein R is the same as hereinabove defined and R^1 is a hydrocarbon radical having vinyl unsaturation; and

C. a benzene sulfonic acid compound of the formula:

wherein R^2 is an alkyl group of from 6–18 carbon atoms and;

D. water;

2. heating the homogenized mixture of (1) to form said polysiloxane; and

3. adding a neutralizing amount of an alkanolamine to said mixture to neutralize said benzene sulfonic acid and to form a neutralized emulsion of said polysiloxane, said polysiloxane having the formula:

wherein R is a monovalent hydrocarbon radical free of unsaturation; R^1 is a hydrocarbon radical having vinyl unsaturation; x and y are positive integers so that the silanol stopped polysiloxane has from 0.1 to 1% by weight of R^1 groups and the viscosity of the polymer ranges between 25,000 centipoises and 1,000,000 centipoises;

ii. an organic hydrogen polysiloxane having the formula: $(R)_a(H)_bSiO_{(4-a-b)/2}$

wherein R is a monovalent hydrocarbon radical free of unsaturation; *a* is from 0 to 3; b is from 0.005 to 2.0 and the sum of *a* plus *b* is from about 0.9 to 3, there being at least two silicon-bonded hydrogen atoms per molecule; and

iii. a platinum catalyst effective to cause copolymerization of (i) (ii); and

b. thereafter drying the treated material.

4,008,347

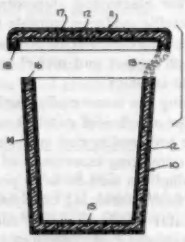
RECEPTACLE OF FOAMED PLASTIC LINED WITH UNORIENTED POLYOLEFIN FILM

Stephen W. Amberg, Toledo, Ohio, and Frank S. Landers, Chicago, Ill., assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed June 24, 1974, Ser. No. 482,321

Int. Cl.² B29D *27/00;* **B32B** *27/08;* **B65D** *25/18, 5/56*

U.S. Cl. 428—35 **9 Claims**

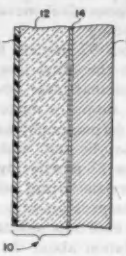


1. A receptacle comprising a base of cellular foam plastic material having a thickness of from substantially 15 to substantially 80 mils, a continuous liner of substantially unoriented polyolefin film having a thickness of from substantially ½ to substantially 5 mils covering the food contacting surfaces of the cellular foam base, and an adhesive comprising a resin plastic material selected from the group consisting of polyvinyl acetate-maleate copolymer, polyamide resin, a blend of polyvinyl acetate and polyvinyl acetate-acrylic copolymer, and ethylene-vinyl acetate copolymer, said adhesive being disposed between said foam base and said liner and securing said base to said liner.

4,008,348
PARTICULATE AND SOLAR RADIATION STABLE COATING FOR SPACECRAFT

Wayne S. Slemp, Newport News, Va., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Continuation of Ser. No. 428,992, Dec. 27, 1973, abandoned.
This application May 16, 1975, Ser. No. 578,240
Int. Cl.² B32B 27/08, 15/08; C23C 13/00; B64C 1/00
U.S. Cl. 428—35 6 Claims



1. In combination:
1. an enclosure and
2. a thermal control coating for said enclosure serving to maintain temperature balance within said enclosure under extended exposure to both particulate and solar radiation,

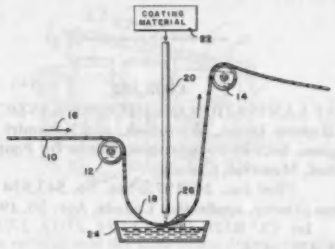
said enclosure serving as a substrate and said thermal control coating being applied to the substrate and including
a. a layer of a solar-radiation stable film having a lower and an upper surface;
b. a superstratum of a particulate-radiation stable film applied to the upper surface of said solar-radiation stable film; and
c. a substratum of a reflecting material applied to the lower surface of said solar radiation stable film, the reflective surface of said substratum being disposed such that solar radiation passing through said superstratum and said solar radiation stable film strikes the reflective surface of said substratum and is reflected back towards said solar radiation stable film and said substratum.

4,008,349
METHOD FOR CONTINUOUSLY APPLYING A UNIFORM RESINOUS COATING BY PASSING THE SUBSTRATE THROUGH A FREE HANGING LOOP CONTAINING THE COATING COMPOSITION

Frank E. Ehrenfeld, Jr., Morrisville, Pa., and Anthony N. Pincente, Lawrenceville, N.J., assignors to Congoleum Corporation, Milwaukee, Wis.

Filed Aug. 28, 1974, Ser. No. 501,261
Int. Cl.² B32B 3/00
U.S. Cl. 428—161 20 Claims

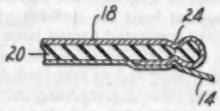
1. A method for continuously applying a resin surface coating to a traveling substrate web consisting essentially of:
a. moving said web into a free hanging loop,
b. continuously feeding a liquid resin containing composition into said loop at a rate so as to maintain at least a slight overflow of said composition at the sides of the loop and to maintain a continuous rolling bank of said composition across the width of said web at the lower portion of said loop,
c. withdrawing said web upwardly from said loop so that excess coating material on the web drains back downwardly into the loop and
d. heating the coated substrate for drying the coating.



4,008,350
VISCO-ELASTIC MATERIAL COMPRISING A POLYMERIC FOAM IMPREGNATED WITH AN ACRYLIC RESIN

George H. Crawford, Dellwood, and Howell K. Smith, II, Grant Township, Washington County, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 31, 1972, Ser. No. 285,320
Int. Cl.² B32B 3/26, 5/18
U.S. Cl. 428—311 2 Claims



1. A visco-elastic material having retarded recovery characteristics comprising a polymeric foam impregnated with an acrylic resin, said foam having a compression modulus at a compression rate of 2 inches per minute, of about 1-to-15 pounds per square inch and having a compression modulus versus time curve slope of about −0.3 to −2.0 pounds per square inch per second when compressed to 50 percent of the original thickness at rates ranging from 2-to-20 inches per minute.

4,008,351
FILM OR SHEET MATERIAL HAVING ANTIBACTERIAL AND ANTIFUNGAL ACTIVITIES

Mayumi Inoue; Masaru Shibata, both of Tokyo; Kenzo Takahashi, Yokohama, and Sadao Nakatani, Nishinomiya, all of Japan, assignors to Sumitomo Bakelite Company, Limited and Mayumi Inoue, both of Tokyo, Japan

Filed May 12, 1975, Ser. No. 576,316
Claims priority, application Japan, May 17, 1974, 49-54438
Int. Cl.² A01N 17/12, 9/02
U.S. Cl. 428—411 21 Claims

1. A film or sheet material with antibacterial and antifungal activities obtained by milling a mixture comprising a thermoplastic resin, and an amount sufficient to provide said plastic with antibacterial and antifungal properties of a mixture of 2-(4′-thiazolyl)-benzimidazole and N-(fluorodichloromethylthio)-phthalimide, and then shaping the milled mixture.

2. A film or sheet material with antibacterial and antifungal activities obtained by coating a base film or sheet material on one side or both sides with a coating material containing an amount sufficient to provide said film or sheet with antibacterial and antifungal properties of
a mixture of 2-(4′-thiazolyl)-benzimidazole and N-(fluorodichloromethylthio)-phthalimide, or
a mixture of 2-(4′-thiazolyl)-benzimidazole and N-dimethyl-N′-phenyl-N′-(fluorodichloromethylthio)-sulfamide, or

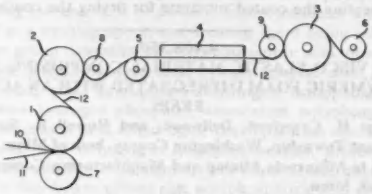
a mixture of N-(fluorodichloromethylthio)-phthalimide and N-dimethyl-N'-phenyl-N'-(fluorodichloromethylthio)-sulfamide.

4,008,352

HEAT LAMINATION OF THERMOPLASTIC FILMS

David Haddon Dawes, Westbrook, and Kashmiri Lal Gupta, Kingston, both of Canada, assignors to Du Pont of Canada Limited, Montreal, Canada

Filed Jan. 24, 1975, Ser. No. 543,924
Claims priority, application Canada, Apr. 30, 1974, 198499
Int. Cl.² B32B *31/28, 27/34, 27/32, 27/36*
U.S. Cl. 428—474 17 Claims



1. A process for the manufacture of a thermoplastic film laminate wherein at least one surface of a thermoplastic first film selected from the group of polyethylene, polyamide, and polyester is laminated to a surface of a thermoplastic second film of polyethylene, at least the surfaces of said first and second films that are laminated having been treated with a corona discharge, said first and second films having similar melting points and at least one of said films is a film of low-melting polymer, said process comprising the steps of:
   a. bringing the corona discharge-treated surface of the first film into face-to-face contact with the corona discharge-treated surface of the second film,
   b. contacting the resulting combination of films with at least one roll heated to a temperature greater than the temperature required to form a laminate having low peel strength but less than the temperature at which the laminate adheres to the heated roll,
   c. increasing the peel strength of the laminate by passing the laminate through a heated zone, said heated zone being at a temperature at least as high as that of the heated roll, and
   d. cooling the laminate so formed.

14. A laminate of peel strength of at least 300 gm/inch, said laminate having been manufactured from thermoplastic films, in which at least one surface of a first film selected from the group consisting of polyethylene, polyamide, and polyester is laminated to a surface of a second film of polyethylene containing an adhesion promoter of fumaric acid, at least the surfaces of said first and second films that are laminated having been treated with a corona discharge, said first and second films having similar melting points and at least one of said films is a film of low-melting polymer, the process of manufacturing said laminate further comprising the steps of:
   a. bringing the corona discharge-treated surface of the first film into face-to-face contact with the corona discharge-treated surface of the second film and contacting the resulting combination of films with at least one roll heated to a temperature greater than the temperature required to form a laminate having a low peel strength but less than the temperature at which the laminate adheres to the heated roll,
   b. increasing the peel strength of the laminate by passing the laminate through a heated zone, said heated zone being at a temperature at least as high as that of the heated roll, and
   c. cooling the laminate so formed.

4,008,353

WATER SWELLABLE ARTICLES

James R. Gross, Lake Jackson, and Russell T. McFadden, Freeport, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 450,650, March 13, 1974, Pat. No. 3,926,891. This application June 30, 1975, Ser. No. 591,740
Int. Cl.² B05D *5/04, 3/00;* B32B *27/04, 27/12*
U.S. Cl. 428—522 4 Claims

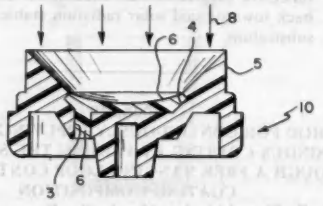
1. A method of preparing an absorbent article coated with a substantially dry, water swellable flexible polyacrylate which comprises
   A. applying a coating on an article wherein the coating comprises a crosslinkable aqueous solution which is prepared by forming a polyacrylate solution having about 30 to about 70 weight percent alkali metal carboxylates by dissolving in an aqueous alkali metal hydroxide solution a polyacrylate comprising
      1. about 30 to about 92 percent by weight of an alkyl acrylate wherein the alkyl group has 1–10 carbon atoms, an alkyl methacrylate wherein the alkyl group has 4–10 carbon atoms, or mixtures thereof,
      2. about 8 to about 50 percent by weight of an olefinically unsaturated carboxylic acid, and
      3. about 0 to about 15 percent by weight of an omega hydroxy-alkyl acrylate having 1–4 carbon atoms in the hydroxy alkyl group
   heating the solution until saponification is complete, and adding to said solution about 0.1 to about 10 weight percent, based on the dissolved polymer, of a water soluble crosslinking agent which is reactive with carboxylate salt groups
   B. heating said coated article to a temperature greater than about 30° C to crosslink said polyacrylate.

4,008,354

PRESSURE VENT-SEALED PRIMARY AND SECONDARY ALKALINE CELLS

Arthur Fitchman, Yonkers, N.Y., and Terry Doug Wyatt, Cleveland, Tenn., assignors to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Filed May 12, 1975, Ser. No. 576,406
Int. Cl.² H01M *2/12*
U.S. Cl. 429—56 6 Claims

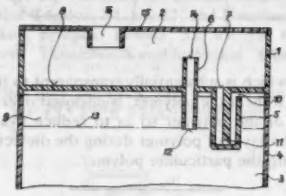


1. A method of making a pressure responsive vent for and electrical device having a member with a vent hole therein wherein said vent hole is closed with a hot melt, extrudible material comprising the steps of pre-heating said member to a temperature which facilitates joining the extrudible material and the member, and applying said hot melt, extrudible material to said member to close said vent hole, whereupon said extrudible material and said member becomes bonded to each other and said extrudible material is capable of being extruded through the vent hole upon development of a predetermined abnormal pressure thereby allowing said abnormal pressure to be relieved through said vent hole.

4,008,355
STORAGE BATTERY WITH COMMON EXPANSION AND FILLER CHAMBER

Wilhelm Perkams, Oberrot, Germany, assignor to AS-Motor GmbH KG, Oberrot, Germany

Filed Mar. 4, 1976, Ser. No. 663,757
Claims priority, application Germany, Apr. 19, 1975, 2517497
Int. Cl.² H01M 2/36
U.S. Cl. 429—63 10 Claims



1. Storage battery having a housing (1,4) defining a plurality of adjacently located cells (3) therein, each having an upper wall (8), and a gas expansion and filler chamber (2) common to all the cells, located above the upper wall of said cells (3), said housing being formed with electrolyte inlet means (16) communicating with said common expansion and filler chamber (2);

an inlet duct system comprising a general U-shaped inlet tube (5, 5') having a first downwardly extending portion and a second upwardly extending portion for each cell, in fluid communication with said common expansion and filler chamber (2), the upwardly extending portion being open to communicate with the respective cell (3);

and an overflow tube (6) for each cell, each overflow tube having a lower end located just below the electrolyte level (13) of the respective cell, and below the outlet (10) of the respective U-shaped inlet tube (5, 5'), and extending in fluid communication into the common expansion and filler chamber (2),

wherein the improvement comprises

means presenting a greater flow resistance against reverse flow of electrolyte from the respective cell through the respective inlet tube to the common chamber than through the overflow tube, matched to the gas pressure arising in the space between the upper wall (8) of the cell and the electrolyte level (13) therein to draw excess electrolyte from the respective cell through the overflow tube (6) into the expansion and filler chamber (2) before electrolyte in said inlet tube (5, 5') is displaced by gases in said space to permit gas flow through the inlet tube into the expansion and filler chamber (2).

4,008,356
CELL RETAINING CASING FOR PHOTOGRAPHIC CAMERAS

Seizi Asano, Okegawa, Japan, assignor to Fuji Photo Optical Co., Ltd., Omiya, Japan

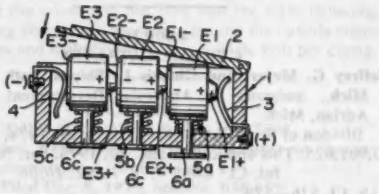
Filed Oct. 22, 1975, Ser. No. 624,599
Claims priority, application Japan, Nov. 1, 1974, 49-132815[U]
Int. Cl.² H01M 2/10
U.S. Cl. 429—98 8 Claims

1. A casing for retaining therein a series of dry cells for a photographic camera or the like comprising:

a housing for retaining therein a series of dry cells connected in series in a line,

a pair of oppositely disposed electrode springs provided on the opposite ends of the housing to sandwich the series of dry cells therebetween so that the series of dry cells arranged in a line are in pressure contact with each other,

means for holding dry cells in the housing allowing the dry cells to transversely move independently of each other and urging said cells in one transverse direction, and

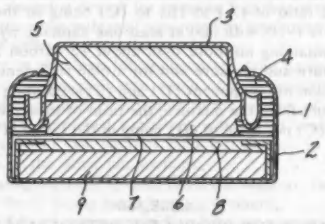


means for moving said dry cells in the direction opposite to said transverse direction in which the cells are urged.

4,008,357
BERYLLIUM BATTERY

Hajime Nishimura, Tokyo, and Mitsuhisa Toda, Kawagoe, both of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Sept. 23, 1975, Ser. No. 615,887
Claims priority, application Japan, Sept. 27, 1974, 49-111088; Nov. 11, 1974, 49-129762
Int. Cl.² H01M 2/16
U.S. Cl. 429—142 5 Claims



1. A beryllium battery comprising:

an outside casing having one open end;

an aperture sealing plate, said aperture sealing plate closing said open end in said outside casing and being electrically insulated from said casing;

an anode of beryllium metal coupled to said aperture sealing plate;

a cathodic material, said cathodic material being coupled to the inside of said outside casing;

a first permeable member in contact with said anode;

a second permeable member in contact with said cathodic material;

a separator means separating said first permeable member from said second permeable member;

a retainer ring for holding said second permeable member in contact with said cathodic material; and

an organic electrolyte disposed in said first and second permeable members.

4,008,358
PROCESS FOR POLYMERIZING OLEFIN

Toshizo Abe; Seiho Sakamoto; Yasuhiro Nishihara, and Hidetoshi Saruwatari, all of Kurashiki, Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Filed June 26, 1975, Ser. No. 590,506
Claims priority, application Japan, July 27, 1974, 49-73675
Int. Cl.² C08F 4/68, 4/64
U.S. Cl. 526—116 13 Claims

1. A process for polymerizing an olefin which comprises effecting said polymerization in contact with a catalyst which is a combination of (1) a solid component prepared by treat-

ing a mixture of (a) a titanium tetrahalide, (b) a vanadyl alcoholate and (c) a vanadyl trihalide, with an organoaluminum compound; and (2) an organoaluminum compound.

4,008,359

CHROME CATALYST

Jeffrey G. Meyer, and Glennis L. Phipps, both of Adrian, Mich., assignors to Anderson Development Company, Adrian, Mich.

Division of Ser. No. 456,123, March 29, 1974, Pat. No. 3,901,825. This application Jan. 20, 1975, Ser. No. 542,164

Int. Cl.² C08F *4/78, 10/02, 10/06*

U.S. Cl. 526—129 **7 Claims**

1. The method comprising (1) mixing (A) a chromium trisdiorgano-orthophosphate of the formula $Cr[OP(O)(OR)_2]_3$ in which each R is selected from the class consisting of non-aromatic hydrocarbon groups free of aliphatic unsaturation and containing one to eight carbon atoms, alkoxyalkyl groups containing three to six carbon atoms and chlorinated and brominated derivatives thereof, (B) an alkyl aluminum of the general formula $R'_2R''Al$ in which each R′ is an alkyl group of 1 to 6 carbon atoms and each R″ is selected from the group consisting of alkyl groups of 1 to 6 carbon atoms and hydrogen atoms, and (C) a halogenated olefin of from four to about eight carbon atoms, said olefin containing at least four halogen atoms at least two of which are attached to olefinic carbon atoms, there being at least one olefinic bond in conjugation with another double bond or at least one halogen atom attached to a carbon atom alpha to an olefinic double bond, the mole ratio of (A) to (B) to (C) being in the range of 0.001–1:1: 1–10, with (D) at least one aliphatic hydrocarbon olefin containing no more than about 12 carbon atoms at a temperature and pressure and for a time sufficient to initiate the reaction of component (D) and (2) separating the resulting product from the mixture, the ratio of total moles of (A) + (B) + (C) per mole of (D) being in the range of 0.001:1 to 0.05:1.

4,008,360

PROCESS FOR PRODUCING PETROLEUM RESIN

Ken-ichi Kudo; Yoshihiko Kitagawa, and Hideyuki Kuribayashi, all of Niihama, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Jan. 3, 1975, Ser. No. 538,406

Claims priority, application Japan, Jan. 8, 1974, 49-5753

Int. Cl.² C08F *240/00*

U.S. Cl. 526—237 **10 Claims**

1. A process for producing a petroleum resin having a molecular weight, softening point, holding power, adhesion strength and rolling-ball tack suitable for use as an adhesive tape resin which comprises polymerizing in the presence of a Friedel-Crafts catalyst a C_5-fraction from cracked naphtha or oil gas, having a composition consisting essentially of acyclic diolefins, cyclic diolefins and monoolefins wherein the weight ratio of acyclic diolefins to monoolefins and the weight ratio of cyclic diolefins to monoolefins are from 0.40 to 0.70 and from 0.07 to 0.35, respectively.

4,008,361

REMOVAL OF RESIDUAL VINYL HALIDE MONOMER FROM VINYL HALIDE POLYMERS BY RADIO FREQUENCY DIELECTRIC HEATING

Anthony John Park, South Croydon, and Brian Weeks, Epsom, both of England, assignors to The British Petroleum Company Limited, London, England

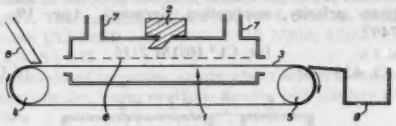
Filed Dec. 11, 1975, Ser. No. 639,967

Claims priority, application United Kingdom, Oct. 23, 1975, 43580/75

Int. Cl.² C08F *6/00*

U.S. Cl. 528—503 **18 Claims**

1. The process for reducing the vinyl halide residual monomer content of a polymer containing vinyl halide monomer which comprises heating a water-containing layer of the polymer in particulate form in a zone of radiofrequency dielectric heating in which zone a layer of material through which vinyl chloride can pass but which restricts the passage of water



vapour, and which is substantially transparent to the radiofrequency used to heat the polymer, is disposed over the surface of the layer of the polymer so as to reduce evaporation of water from the layer of polymer during the dielectric heating, and recovering the particulate polymer.

4,008,362

1-N-((S)-α-SUBSTITUTED-ω-AMINOACYL)-NEAMINE OR -RIBOSTAMYCIN AND THE PRODUCTION THEREOF

Eiichi Akita, Kamakura; Tsutomu Tsuchiya, Yokohama; Shinichi Kondo, Yokohama; Shuntaro Yasuda, Yokohama; Sumio Umezawa, Tokyo, and Hamao Umezawa, Tokyo, all of Japan, assignors to Meiji Seika Kaisha, Ltd., Tokyo, Japan

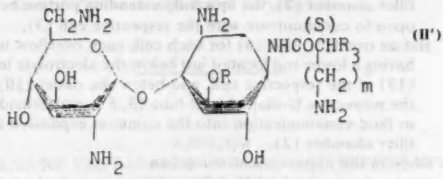
Filed Aug. 21, 1973, Ser. No. 390,217

Claims priority, application Japan, Aug. 25, 1972, 47-84633

Int. Cl.² C02H *9/02*

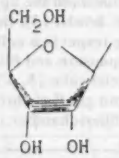
U.S. Cl. 536—17 **6 Claims**

1. A substance of the formula:



(II′)

wherein R is a hydrogen atom or β-D-ribofuranosyl of the formula



R_3 is hydroxyl, $-NH_2$ or $-NHR_4$ in which R_4 is an alkanoyl of 1–4 carbon atoms, and m is a whole number of 1, 3 or 4, when R is β-D-ribofuranosyl and m is a whole number of 1, 2, 3, or 4 when R is a hydrogen atoms.

4,008,363

PROCESS FOR THE PREPARATION OF ADENINE DERIVATIVES MADE FUNCTIONAL AND PRODUCTS OBTAINED THEREFROM

Luciano Re, Rome, and Piergiorgio Zappelli, Monterotondo, both of Italy, assignors to Snam Progetti S.p.A., Milan, Italy

Filed Apr. 29, 1975, Ser. No. 572,653

Claims priority, application Italy, Apr. 30, 1974, 22105/74

Int. Cl.² C07H *19/20*

U.S. Cl. 536—28 **2 Claims**

1. Nicotinamide 6-(2-hydroxy-3-carboxypropylamino) purine dinucleotide.

4,008,364

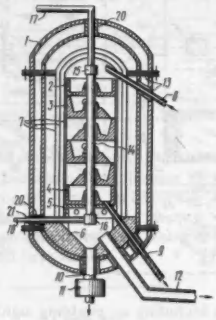
APPARATUS FOR CONTINUOUS REFINING OF METALS

Jury Fedorovich Frolov, prospekt Karla Marxa, 8/2, kv. 70; Jury Anatolievich Naryshkin, ulitsa Bljukhera, 7, kv. 55; Vladimir Semenovich Cherednichenko, ulitsa Zorge, 269, kv. 79; Jury Fedorovich Piljukov, ulitsa Nemirovicha-Danchenko, 163, kv. 6; Gennady Ivanovich Orlov, ulitsa Vatutina, 27, kv. 20, all of Novosibirsk; Aron Semenovich Mikulinsky, ulitsa Bosova, 1, kv. 54, Istra Moskovskoi oblasti; Serafim Nikolaevich Suturin, ulitsa Savvy Kozhevnikova, 2, kv. 22, Novosibirsk; Leonid Vladimirovich Slobodkin, ulitsa Gogolya, 34, kv. 32, and Konstantin Stepanovich Dashkov, prospekt Lenina, 52, kv. 10, both of Ust-Kamenogorsk Vostochno-Kazakhstanskoi Oblasti, all of U.S.S.R.

Filed July 24, 1975, Ser. No. 599,040

Int. Cl.² F27B *17/00;* F27D *7/06*

U.S. Cl. 13—20 8 Claims



1. An apparatus for the continuous refining of metals, comprising: an air-tight cooled casing (1) in which vacuum is maintained; a distillation column set up under the vacuum inside said casing and made up of a number of evaporation stages (3) and of an upper intake stage (2) that is continuously fed with molten metal which, being refined, flows off in succession through all said evaporation stages into a lower accumulating stage (4) wherein the refined metal is collected; condensing shields (7) surrounding said stages; an electric heater (14) including a group of graphite rods running through said stages along the entire height of said column; means (17, 18) for supplying electric energy to said rods; said evaporation stages constituting containers with metal overflows, the shape and arrangement of said containers ensuring continuous discharge of the molten metal from said intake stage to said accumulating stage in the form of a thin film passing in a zone of thermal influence of said heater which provides a temperature sufficient for the distillation from metal of volatilized impurities.

4,008,365

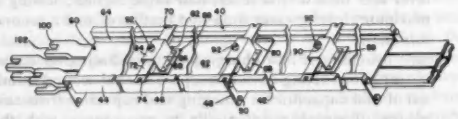
BUS TRAY ELECTRICAL DISTRIBUTION SYSTEM

Elmer T. Carlson, Granby, Conn., assignor to Broadhill Development Corporation, Plainville, Conn.

Filed Mar. 3, 1975, Ser. No. 554,684

Int. Cl.² H02G *5/06*

U.S. Cl. 174—68 B 7 Claims



7. In a bus tray electrical distribution system, a bus tray extending a substantial length and having side walls with flanges extending out, flat insulated rigid and flexible bus bars side by side lying in the bus tray, a cover assembled with the bus tray to be located on top of the bus bars and be coextensive with the bus tray, means for holding the cover on and compressing the cover and bus bars into the trays including clamps having clamp ends extending around the outside edges of the flanges and including also only a single bolt per clamp.

4,008,366

COUPLING FOR BUS BAR SYSTEM

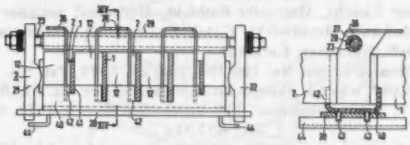
Gerhard Geyer, Regensburg, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Dec. 8, 1975, Ser. No. 638,659

Claims priority, application Germany, Dec. 12, 1974, 2458925

Int. Cl.² H02G *5/00;* H02B *1/20;* H01R *7/08*

U.S. Cl. 174—88 B 5 Claims



1. A coupling for a bus bar system having a plurality of bus bars at different potentials arranged in a stack, the coupling including a clamping device for pressing together sections of bus bars of the same potential separated by insulating spacers from bars of different potential comprising:

a. support in the form of an insulated tray having a U-shaped cross section, the walls of said insulated tray having spaced slots conforming to the profiles of the bus bars to be supported such that, when said coupling is used, said tray will support each bar section in proper relation to the other bar sections;

b. a clamping element spaced from the support, the open side of the U facing said clamping element;

c. a pair of lever means extending between corresponding ends of the support and the clamping element and adapted to embrace a stack of bus bars; and

d. adjustable clamping means mounted on the clamping element for applying pressure on a stack of bars through said lever means.

4,008,367

POWER CABLE WITH PLASTIC INSULATION AND AN OUTER CONDUCTING LAYER

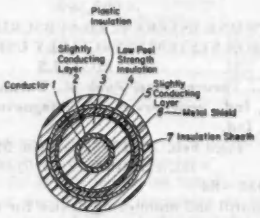
Heinz Sünderhauf, Berlin, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed June 23, 1975, Ser. No. 589,006

Claims priority, application Germany, June 24, 1974, 2430792

Int. Cl.² H01B *7/22*

U.S. Cl. 174—107 10 Claims



1. In a power cable including a central conductor, an ex-

truded inner conducting layer surrounding said conductor, an inner layer of extruded insulation surrounding said inner conducting layer, an extruded outer conducting layer surrounding said insulating layer, a metal shield surrounding said outer conducting layer, and an outer insulating layer surrounding said metal shield, an improved construction permitting said outer insulating layer, metal shield and outer conducting layer to be peeled away from said inner insulating layer without damage to said outer conducting layer, comprising an intermediate insulating layer having a mechanical peel strength lower than the mechanical peel strength of the outer conducting layer and of said inner insulating layer, said intermediate insulating layer interposed between said inner insulating layer and said extruded outer conducting layer.

4,008,368

ELECTRICAL CONDUCTOR HAVING INHIBITED POLYMER COMPOSITIONS

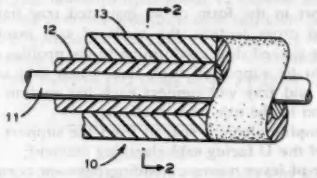
Ottmar Leuchs, Hannover-Bothfeld, Germany, assignor to Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft, Hannover, Germany

Division of Ser. No. 109,390, Jan. 25, 1971, Pat. No. 3,943,087, which is a continuation-in-part of Ser. No. 823,033, May 8, 1969, abandoned. This application Dec. 3, 1975, Ser. No. 637,314

Claims priority, application Germany, May 11, 1968, 1769343

Int. Cl.² C08K *5/49*; H01B *7/00*

U.S. Cl. 174—120 R **10 Claims**



1. In an article, comprising an electrical conductor, an insulator and a jacket, the improvement comprising, at least one of said jacket and insulator being formed from a member selected from the group consisting of polyvinyl chloride and polychloroprene, said member being plasticized with a plasticizing amount of a non-flammable plasticizer, said member containing a material selected from the group consisting of the carbonates of calcium, barium, magnesium, strontium, sodium, potassium, lithium and mixtures thereof, said material having an average particle size which does not exceed 250 millimicrons and being present in an amount which is at least sufficient to combine with essentially the entire amount of hydrogen chloride which is evolved at temperatures which occur in a fire to thereby prevent evolution into the surrounding atmosphere of the hydrogen chloride when the article is subjected to said temperatures.

4,008,369

TELEPHONE INTERFACED SUBSCRIPTION CABLE TELEVISION SYSTEM ESPECIALLY USEFUL IN HOTELS AND MOTELS

Donald L. Theurer, and Paul M. Dormans, both of Fort Wayne, Ind., assignors to The Magnavox Company, Fort Wayne, Ind.

Filed Feb. 28, 1975, Ser. No. 554,347

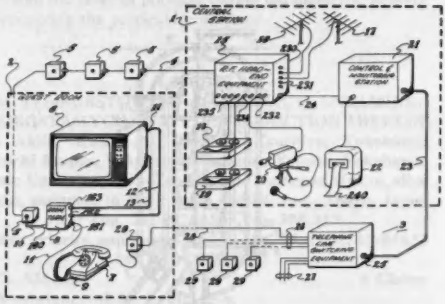
Int. Cl.² H04N *7/16*, *7/18*

U.S. Cl. 358—84 **6 Claims**

1. A control and monitoring device for use in a telephone interfaced subscriber television system for receiving from a telephone exchange system subscriber initiated telephone signals and for supplying signals to the automatic telephone exchange system including enabling signals peculiar to the telephone signals, comprising:

first means having an input for receiving the telephone signals from the automatic telephone exchange system including a pulse train consisting of a predetermined number of one or more pulses, said pulse train representing a subscriber request for a particular television program signal, and responsive to the predetermined number of said one or more pulses in the pulse train for providing an output signal on a predetermined one of N number of separate outputs; and

second means connected to said first means and responsive to the output signal on the predetermined one of the N number of separate outputs of said first means for providing simultaneous output signals on a predetermined number of n number of separate outputs; and



third means including an enabling signal source for selectively generating simultaneously the predetermined number of n number of enabling signals each signal having a different signal frequency, said third means having an output adapted to be connected to the automatic telephone exchange system for supplying the enabling signals to said system and connected to said second means and responsive to the output signals on the predetermined number of the n number of separate outputs of said second means for providing at the output of said third means the predetermined number of the n number of enabling signals from said enabling signal source whereby said predetermined enabling signals are a function of the number of pulses in said pulse train.

4,008,370

AUTOMATIC NOISE GATE FOR A SYNCHRONIZING SIGNAL AMPLIFIER

Leslie Ronald Avery, Lightwater, England, assignor to RCA Corporation, New York, N.Y.

Filed Jan. 19, 1976, Ser. No. 649,973

Claims priority, application United Kingdom, Sept. 15, 1975, 37881/75

Int. Cl.² H04N *5/08*

U.S. Cl. 358—155 **5 Claims**

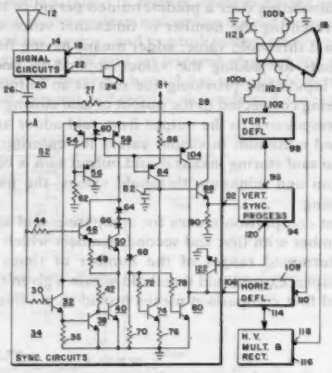
1. In a synchronizing signal amplifier, an automatic noise gate comprising:

a capacitor having a first terminal adapted to be coupled to a source of synchronizing signals, having a maximum level less than a first level, and noise signals, having a maximum level greater than said first level, and a second terminal;

means providing a first charging path, including an active current conducting device, coupled to said second terminal of said capacitor for charging said capacitor from said source of signals substantially in accordance with the characteristics of said first charging path when said active current conducting device is enabled; and

sensing means providing a second charging path coupled to

said second terminal of said capacitor and said means providing a first charging path for enabling said active current conducting device when signals produced by said source of signals is less than said first level and for disabling said active current conducting device when signals



produced by said source of signals is greater than said first level, thereby providing for charging of said capacitor from said source of signals substantially in accordance with the characteristics of said second charging path when signals produced by said source of signals are greater than said first level.

4,008,371

IMAGING SYSTEMS

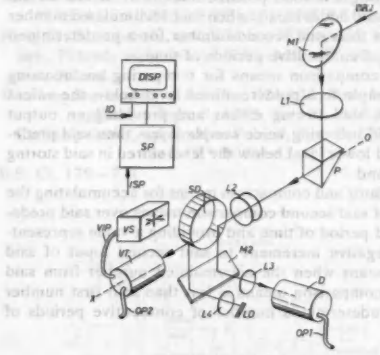
Donald Robert Barron, Sunbury-on-Thames, England, assignor to EMI Limited, Hayes, England

Filed Aug. 6, 1975, Ser. No. 602,412

Claims priority, application United Kingdom, Aug. 8, 1974, 35077/74

Int. Cl.² H04N *3/08, 7/18*

U.S. Cl. 358—206 **11 Claims**



1. In a scanning imaging system of an objective lens supported for forming a first image with radiation collected from an area of view and a scanning arrangement operable to scan radiation from said first image over a detector to form the scanned image the improvement of a collimating lens between the objective and a rotating parallel-faceted scanning element smaller than that required for the first image for forming from said first image a second enlarged image of said area thereby to direct the radiation collected from the area toward a collimating lens exit pupil of smaller aperture than the radiation collecting aperture and occurring within the rotational sweep of said smaller scanning element for deflection of said radiation onto said detector by said smaller scanning element rotatably passing between the collimating lens and its exit pupil.

4,008,372

TV CAMERA

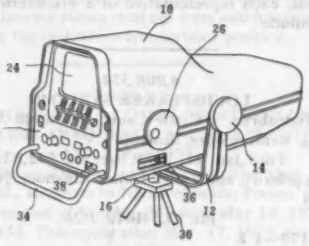
Atsushi Ueno; Kiyoharu Sakai, and Showhey Fujimoto, all of Tenri, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Dec. 1, 1975, Ser. No. 636,423

Claims priority, application Japan, Nov. 28, 1974, 49-137171; Nov. 29, 1974, 49-139708; Nov. 29, 1974, 49-139710; Nov. 29, 1974, 49-139711

Int. Cl.² H04N *1/03*

U.S. Cl. 358—227 **10 Claims**



1. A TV camera comprising a casing surrounding a body of the TV camera, electrical and optical components enclosed in the casing, and support means for supporting the body of said TV camera and for providing the body with pan and tilt movements, said support means comprising a shaft provided through the body of the TV camera at a position slightly above its center of gravity and means for rotatably supporting said shaft.

4,008,373

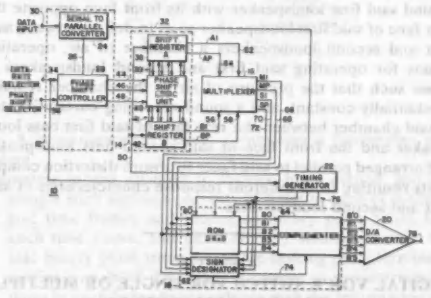
DIGITAL DIFFERENTIAL PHASE SHIFT KEYED MODULATOR

Harold Garth Nash, Tempe, Ariz.; Gene Arnold Schriber, Austin, Tex., and John Robert Linford, Broomfield, Colo., assignors to Motorola, Inc., Chicago, Ill.

Filed Oct. 3, 1975, Ser. No. 619,439

Int. Cl.² H04L *27/18*

U.S. Cl. 178—67 **9 Claims**



1. A digital differential phase shift keyed modulation system for encoding digital dibits of data comprising:

a. timing means for generating timing signals;

b. digital control circuit means responsive to said timing signals and a phase shift control signal for accepting digital dibits of data and for generating a digital control output signal;

c. digital phase shifter means coupled to said control circuit means and responsive to said timing signals for generating a main and a secondary channel digital output signal alternately at a first and a second output terminal means during successive dibit intervals, said main channel digital output signal being phase shifted a predetermined amount with respect to a main channel digital output signal generated during a preceding dibit interval in response to said digital control output signal;

d. multiplexer means coupled to said first and second output terminal means of said phase shifter means for transmitting said main channel digital output signal on a third output terminal means and said secondary channel digital output signal on a fourth output terminal means;

e. digital number generator means coupled to said third and fourth output terminal means and responsive to said timing signals for generating a series of digital output signals, each representative of a predetermined analog magnitude.

4,008,374

LOUDSPEAKER SYSTEMS

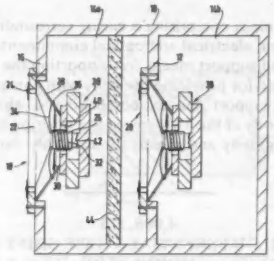
Ivor S. Tiefenbrun, 1 Castle Court, Broomhill Ave., Newton Mearns, Renfrewshire, Scotland

Filed Jan. 21, 1975, Ser. No. 542,821

Claims priority, application United Kingdom, Jan. 26, 1974, 03726/74

Int. Cl.² H04R *1/28*

U.S. Cl. 179—1 E **6 Claims**



1. A bass unit for a loudspeaker system comprising a casing, a first bass loudspeaker having front and rear faces, said first bass loudspeaker being so mounted in the casing that the front face of the said first bass loudspeaker faces outwardly of the casing, a second bass loudspeaker having front and rear faces, said second bass loudspeaker being mounted in the casing behind said first loudspeaker with its front face opposite the rear face of said first loudspeaker so as to define between said first and second loudspeakers a chamber of air, operating means for operating said first and second loudspeakers in phase such that the pressure of air in the chamber remains substantially constant, and a sound absorbing curtain located in said chamber between the rear face of said first bass loudspeaker and the front face of said second bass loudspeaker and arranged parallel to said faces to absorb distortion components resulting from different response characteristics of said first and second loudspeakers.

4,008,375

DIGITAL VOICE SWITCH FOR SINGLE OR MULTIPLE CHANNEL APPLICATIONS

Raymond H. Lanier, Hyattsville, Md., assignor to Communications Satellite Corporation (COMSAT), Washington, D.C.

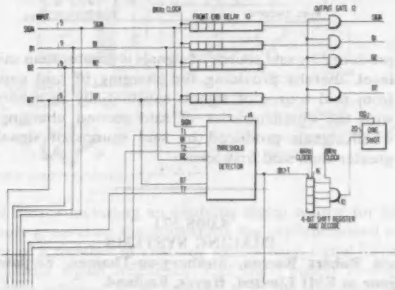
Filed Aug. 21, 1975, Ser. No. 606,828

Int. Cl.² H04B *15/00*

U.S. Cl. 179—1 VC **8 Claims**

1. A voice switch of the type comprising means for storing a value representing a threshold level, threshold detector means for providing an output threshold signal each time a voice sample applied thereto exceeds a threshold level applied thereto, means for connecting said value stored in said storing means to said threshold detector means, means for connecting periodic samples of a signal on a channel adapted to carry voice signals to said threshold detector, accumulator means for accumulating over a predetermined period of time a number representing the number of times that voice samples exceeds said threshold value, adder means having first and second inputs for adding the values applied to said first and second inputs and providing the sum at an output, said first input being connected to the output of said storing means, and means responsive to the output from said adder and to maximum and minimum threshold values for entering the output sum into said storing means if said output sum is between said maximum and minimum threshold values, the improvement comprising:

a. first comparison means for comparing said accumulated number with first and second numbers which define predetermined ranges of the number of times that voice samples exceed said threshold within a given time period, said first comparison means providing a value represent-



ing a first positive increment to the second input of said adder means when said accumulated number is greater than said first number but less than or equal to said second number for a predetermined number of consecutive predetermined periods of time and for providing a value representing a second positive increment to the second input of said adder means when said accumulated number is greater than said second number for a predetermined number of consecutive periods of time,

b. second comparison means for comparing an incoming voice sample to a predetermined level below the values stored in said storing means and providing an output when said incoming voice sample is less than said predetermined lower level below the level stored in said storing means, and

c. accumulator and comparison means for accumulating the output of said second comparison means over said predetermined period of time and providing a value representing a negative increment to said second input of said adder means when the accumulated number from said second comparison means is less than said first number for a predetermined number of consecutive periods of time.

4,008,376

LOUDSPEAKING TELECONFERENCING CIRCUIT

James Loton Flanagan, Warren; Donald John MacLean, Jr., Scotch Plains, and James Edward West, Plainfield, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

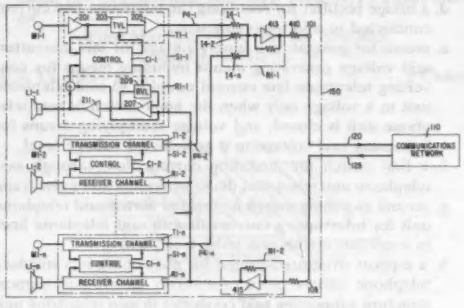
Filed Oct. 17, 1975, Ser. No. 623,545

Int. Cl.² H04M *3/08*

U.S. Cl. 179—1 CN **19 Claims**

1. A conferencing system for a plurality of remote conference locations comprising a plurality of loudspeaking tele-

phone sets at each conference room location, an incoming terminal and an outgoing terminal at each conference room location, and a communication path between the incoming and outgoing terminals of said locations; each loudspeaking telephone set comprising a microphone, a loudspeaking device, a transmit channel having an input connected to said microphone and an output, a receive channel having an input coupled to said incoming terminal and an output connected to said loudspeaking device, and control means jointly responsive to speech energy on said set transmit channel and speech energy on said set receive channel for selectively activating one of said set transmit and receive channels and concurrently



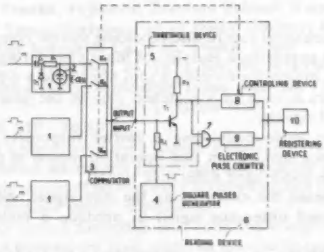
deactivating the other of said set transmit and receive channels, the control means of each loudspeaking telephone set being operative independently of the control means of the other loudspeaking telephone set, and means connected between the output of each transmit channel and said conference room location outgoing terminal for combining the outputs of said active transmit channels and for applying said combined output to said conference room location outgoing terminal, said communication path comprising means for coupling the combined output from the outgoing terminal of one conference room location to only the incoming terminals of the other remote locations.

4,008,377

ARRANGEMENT FOR REGISTERING AND READING OF MESSAGE UNITS IN TELEPHONE EXCHANGES

Jerzy W. Szczepanski, and Wieslaw Wilczynski, both of Warsaw, Poland, assignors to Politechnika Warszawska, Warsaw, Poland

Continuation-in-part of Ser. No. 421,634, Dec. 4, 1973. This application Sept. 5, 1975, Ser. No. 610,733
Claims priority, application Poland, Dec. 7, 1972, 159356
Int. Cl.² H04M *15/12*
U.S. Cl. 179—7 R 4 Claims



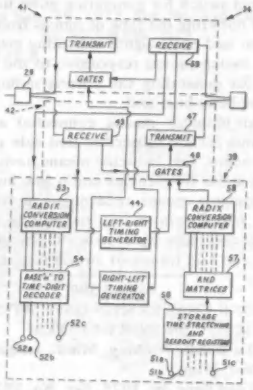
1. An arrangement for registering and reading message units in telephone or Telex exchanges comprising, in combination, electrochemical integrators, each having a first electrode connected to ground potential and having a second electrode, sources connected to corresponding integrators and supplying metering pulses to said integrators, a resistor connected between each source and the second electrode of the corresponding electrochemical integrator, a reading system for reading the outputs of said integrators, a commutator with a plurality of positions connecting selectively the second electrode of an integrator with said reading system, said reading system comprising a threshold device detecting an increase of voltage across the terminals of an integrator which is connected to said reading system, said threshold device having an output, and a generator generating standard square-wave pulses having their polarization opposite to that of the metering pulses, an AND gate having a first input connected to said generator and having a second input connected to the output of said threshold device, a pulse counter connected to the output of said AND gate for counting gated pulses from said generator, said pulse counter having an output, means for controlling the commutator and having an output for indicating the commutator position, and means connected to the output of said pulse counter and the output of said controlling means for registering pulses read out from said integrators and for registering the respective commutator position.

4,008,378

MULTI-RADIX DIGITAL COMMUNICATIONS SYSTEM WITH TIME-FREQUENCY AND PHASE-SHIFT MULTIPLEXING

W. Franklin Nance, Orange, and Robert L. Shacklett, Fresno, both of Calif., assignors to NS Electronics, Fresno, Calif.

Continuation-in-part of Ser. No. 359,864, May 14, 1973, Pat. No. 3,872,255. This application Mar. 17, 1975, Ser. No. 559,127
Int. Cl.² H04L *27/10*
U.S. Cl. 179—15 A 6 Claims



6. A communication system comprising a transmitter including

sampling means adapted to receive input signals and to sample such signals a plurality of times in each of successive time frames and producing binary pulse trains for each time frame, and phase-shifting means operated by said binary pulse trains for phase-shifting predetermined carrier signals of different frequency at predetermined times in each frame in accordance with the information of said binary pulse trains;

a transmission medium connected to the output of said transmitter for transmitting said phase-shifted carriers; and

a receiver connected to said transmission medium and including means for detecting the phase shift of individual cycles of separate carriers and discriminating against noise signals, and means reconstructing the input to said

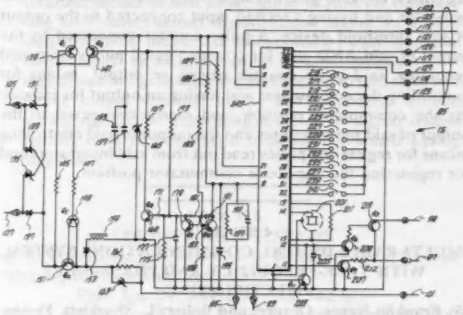
transmitter from said detected carrier phase shifts at predetermined times.

4,008,379

TOUCH-PAD TO DIAL CONVERSION UNIT

Arthur Gene Watkins, Santa Ana, Calif., assignor to San/Bar Corporation, Santa Ana, Calif.

Filed Feb. 14, 1975, Ser. No. 550,008
Int. Cl.² H04M 1/31
U.S. Cl. 179—90 K **11 Claims**



1. A touch-pad to dial-pulse conversion unit incorporable into a subscriber unit connected to a telephone line, said conversion unit receiving signals from a touch-pad switch, that replaces the pulse dialing mechanism of the subscriber unit, and converting them to dial pulses, said conversion unit comprising:

means, responsive to digit indicating signals from said touch-pad switch for generating pulse indicating signals;

means for buffering the flow of signals from said touch-pad switch to said pulse signal indicating means;

transistor switch means responsive to the pulse indicating signals for generating the corresponding dial pulses on said telephone line; and

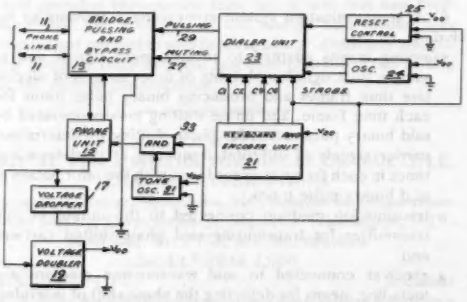
a capacitor-inductor means connected across said telephone line on the subscriber unit side of said transistor switch means, said inductor means having a high impedance to audio frequencies and a low impedance to DC, said capacitor means receiving a portion of the loop current said telephone line and storing sufficient energy to power said pulse signal indicating means, said buffering means, and said transistor switch means.

4,008,380

TELEPHONE CONVERSION UNIT WITH MULTIPLE MEMORY SYSTEM

Richard C. La Borde, Hibbing, Minn., assignor to Rood Tool Co., St. Paul, Minn.

Filed June 30, 1975, Ser. No. 592,056
Int. Cl.² H04M 1/44
U.S. Cl. 179—90 B **6 Claims**



1. In a conventional telephone unit, a converter positioned therein in place of a rotary dialer unit for converting a keyboard coded telephone number to a serial pulse train corresponding to the type generated by said rotary dialer unit, said converter comprising:

a. a keyboard switching means having at least ten keys for generating signals corresponding to each of said keys as said keys are depressed,

b. an electrical encoder means for converting said signals into parallel four bit signals, each encoder signal uniquely identifying a depressed one of said ten keys,

c. a dialer circuit means for converting said encoded signals to a serial pulse train corresponding to the respective keys depressed,

d. a bridge rectifier for rectifying the telephone line current conducted to said telephone unit,

e. means for generating a supply voltage for said converter, said voltage generating means including means for converting telephone line current coupled to said telephone unit to a voltage only when the hook switch of said telephone unit is closed, and voltage multiplying means for increasing said voltage to a preselected voltage level,

f. a first switch for inhibiting current flow through said telephone unit when said dialer generates said pulse train,

g. second switching means connected across said telephone unit for interrupting current flow in said telephone lines in accordance with said pulse train, and

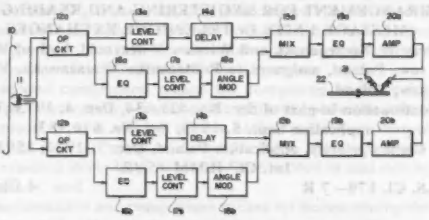
h. a support structure adapted for positioning in a standard telephone unit in place of a rotary dialer, said support structure supporting said converter in said telephone unit housing.

4,008,381

MULTICHANNEL RECORD DISC RECORDING SYSTEM

Nobuaki Takahashi, Yamato; Takaro Mori, and Yoshiki Iwasaki, both of Yokohama, all of Japan, assignors to Victor Company of Japan, Limited, Yokohama, Japan

Filed Sept. 4, 1975, Ser. No. 610,463
Claims priority, application Japan, Sept. 12, 1974, 49-104387; Sept. 12, 1974, 49-104386; Sept. 6, 1974, 49-101953
Int. Cl.² G11B 3/00
U.S. Cl. 179—100.4 ST **7 Claims**



1. A multichannel record disc recording system comprising:

means for supplying a plurality of input channel signals;

operation means for forming a sum signal and a difference signal from each of a matched pair of the plurality of channel signals;

means for angle-modulating a carrier responsive to the difference signal from said operation means to produce an angle-modulated difference signal;

mixing means for multiplexing the sum signal and angle-modulated difference signal to produce a multiplexed signal;

record cutting means for recording the multiplexed signal in one groove cut on the record disc;

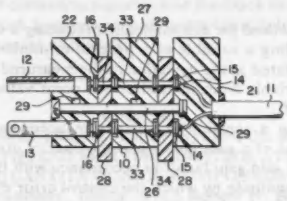
first level control means for controlling the level of the sum signal when the sum signal has a higher than a predetermined level to prevent admixing the higher harmonics of the sum signal into the band of the angle-modulated difference signal; and

second level control means between the operation means and the angle-modulating means for controlling the level of the difference signal in a manner which attenuates the level of the difference signal to prevent overmodulation due to the difference signal being of a high level in angle-modulation responsive to the difference signal in the angle-modulation means.

4,008,382
SAFETY ELECTRICAL PLUG

Richard P. De Rosa, Bound Brook, N.J., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Mar. 10, 1975, Ser. No. 556,843
Int. Cl.² H01R 13/70
U.S. Cl. 200—51 R **2 Claims**



1. An electrical plug fitted with a front section fixed to a rear section with two rotatable members mounted between the said fixed front and rear sections, with each rotatable member fastened so as to be individually rotatable with respect to each other and to a said fixed section which it abuts, each of said fixed sections and said rotatable members fitted with individual conducting elements, with

the individual conducting elements in each rotatable member located to individually electrically connect to an individual conducting element in the abutting fixed section in a given position of rotation of each of both said rotatable members with respect to the said fixed sections, with each individual conducting element in a first rotatable member electrically connected to an individual conducting element in the second rotatable member in said given position of rotation, such that

said rotatable members serve to electrically join the conducting elements of the front section individually to the conducting elements of the rear section only when each rotatable member is rotated to the said given position.

4,008,383
MICROWAVE OVEN DOOR ASSEMBLY

Junzo Tanaka, Fujiidera; Tsuyoshi Takami, Nara, and Toshio Kai, Yamatokoriyama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

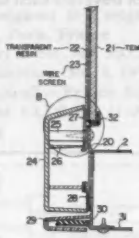
Filed Dec. 24, 1974, Ser. No. 536,095
Claims priority, application Japan, Dec. 28, 1973, 49-3515
Int. Cl.² H05B 9/06
U.S. Cl. 219—10.55 D **12 Claims**

1. In a microwave oven having a heating cavity and means for radiating microwave energy into said heating cavity, a door assembly mounted on said oven for opening and closing access to said heating cavity, comprising:

a door screen formed in said door and comprising an exterior transparent resin plate, an interior strengthened glass plate interposed between said resin plate and said heating cavity, and a shielding body of a wire screen or metal plate having a number of through-holes formed therein laminated between said resin and strengthened glass plates, said resin plate being mounted to permit free expansion and contraction of its peripheral edges;

a peripheral door body, an inner door frame having an L-shaped portion to which said strengthened glass is secured and having a leg substantially parallel to the upstanding leg of said L-shaped portion, and an abutting metal plate in contact with the inner side of said door body and facing said substantially parallel leg of said inner door frame;

wherein said shielding body extends peripherally beyond

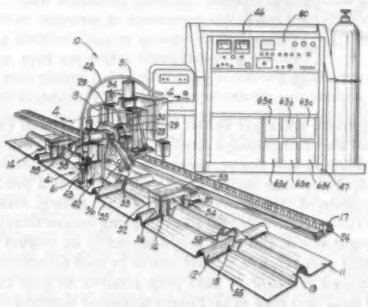


the edges of said strengthened glass plate, said peripherally extending portion of said shielding body being sandwiched between said substantially parallel leg of said inner door frame and said adjacent abutting plate, said peripherally extending portion of said shielding body electrically contacting said abutting plate to prevent leakage of electro-magnetic energy from said heating cavity through said shielding body.

4,008,384
WELDING APPARATUS

Shelby Cecil, Medina, Ohio, assignor to Glitsch, Inc., Dallas, Tex.

Filed Nov. 19, 1973, Ser. No. 416,745
Int. Cl.² B23K 9/12
U.S. Cl. 219—125 R **8 Claims**



1. In a system for automatically guiding a welding apparatus including a welding torch relative to a convoluted surface having a plurality of substantially dominant convolutions within a surface contained substantially in a single plane to weld one such convoluted surface to another such surface substantially in the same plane and having substantially, identical convolutions to be welded to the convolutions of the first such surface, control apparatus controlling the movement of said torch, said control apparatus comprising first drive means moving said torch in a direction parallel to said single plane of said convoluted surfaces, second drive means moving said torch in a direction normal to said single plane of said convoluted surfaces, third drive means moving said torch rotationally about an axis parallel to said single plane, and transverse to the direction of movement caused by said second drive means, first control means activating said first drive means, a mechanical sensor sensing and producing signals only in re-

sponse to said substantially dominant convolutions within said single plane of said convoluted surface, second control means activating said first, second and third drive means in response to the signals from said mechanical sensor at each said dominant convolution, respectively, and at least one selectably programmable memory means, activated by said mechanical sensor, and continuously providing variable information to said first and second control means to control movement of said torch as said torch traverses each said dominant convolution, respectively.

4,008,385

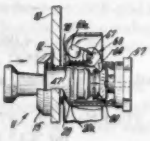
AUTOMOBILE CIGARETTE LIGHTER

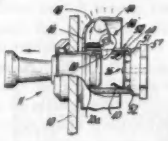
William Draghi, 37-24 95th St., Jackson Heights, N.Y. 11372

Filed Apr. 19, 1976, Ser. No. 678,217

Int. Cl.² F23Q 7/22

U.S. Cl. 219—269 **9 Claims**





1. A cigarette and cigar lighter comprising a tubular casing, a push-pull unit comprising a sleeve slidable in said casing and a plug slidable in said sleeve, means to limit movement of said sleeve relative to said casing in one direction, in a predetermined position of said sleeve relative to said casing, said plug being movable relative to said sleeve, spring means interposed between said sleeve and plug and adapted to be loaded upon moving said plug relative to said sleeve in said direction, to a predetermined position of said plug relative to said casing, means to hold said plug in said predetermined position of said plug relative to said casing, an element on said plug adapted to heat up and glow upon receiving current, means to grip said element to complete an electric circuit through said element, to heat said element to glow, in said predetermined position of said plug relative to said casing and to automatically release said plug when said element is heated to a glowing condition, to allow said loaded spring means to retract said plug relative to said sleeve, and break said circuit through said element, audible signal means and means controlled by said plug, to actuate said signal means to produce an audible signal upon said plug being retracted, said audible signal means comprising a bell, a trigger pivoted relative to said bell, a hammer on said trigger adapted to strike said bell, spring means connecting said trigger to said bell to bias the trigger for rotation in one direction, and means on said plug adapted to rotate said trigger in an opposite direction to load the trigger spring means, upon moving said plug relative to said sleeve in said direction.

4,008,386

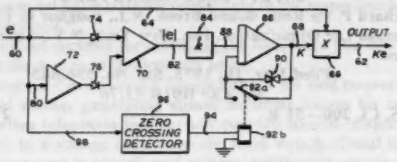
METHOD AND MEANS FOR PRODUCING A CONTROL SIGNAL FOR PROCESS CONTROL INCLUDING REMOVABLE MEANS FOR INCREASING GAIN AS A TIME INTEGRAL OF ERROR

Charles Warren Ross, Hatboro, Pa., assignor to Leeds & Northrup Company, North Wales, Pa.

Filed Jan. 13, 1976, Ser. No. 648,708

Int. Cl.² G05B 11/40

U.S. Cl. 235—150.1 **19 Claims**



1. The method for automatically producing a control signal for controlling a variable of a process to minimize a control error calculated as the deviation of the measured value of that process variable from its desired set point value comprising the steps of;

producing a signal which varies in accordance with the product of a gain factor and the control error,

changing said gain factor in accordance with the integral of the magnitude by which the control error exceeds a predetermined value, and

resetting said gain factor to zero whenever the magnitude of said control error goes through zero so that said signal acts as a control signal which goes to zero when said error goes through zero.

4,008,387

AUTOMATICALLY CONTROLLED CRYSTAL GROWTH

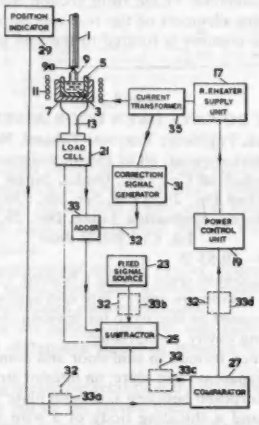
Geoffrey William Green, Malvern; Donald Thomas James Hurle, Welland, and Gordon Charles Joyce, Malvern, all of England, assignors to National Research Development Corporation, London, England

Filed Mar. 31, 1975, Ser. No. 563,441

Claims priority, application United Kingdom, Mar. 29, 1974, 14162/74

Int. Cl.² B01J 17/18; G06G 7/66

U.S. Cl. 235—151.1 **8 Claims**



1. Apparatus for the controlled growth of a crystal comprising a container for containing a charge of material from which said crystal is grown; an electrical heater arranged adjacent to said charge to form a melt of said charge; means for pulling a

crystal from said melt; a feedback loop for controlling the growth of said crystal by controlling energization of said heater, said feedback loop including: a weight function signal generator arranged so as to measure the weight of said melt and to provide an output signal representative of a function of said weight, a comparator, and means for supplying electrical current to said heater; means for providing a reference signal representative of the expected value of said generator output signal to said comparator for comparing said generator output signal with said reference signal and for providing for any difference between said signals a control signal for controlling the current supplied to said heater by said means for supplying current; and wherein the improvement comprises an error correction loop for cancelling an error in the weight measured by said weight function signal generator, said error correction loop including: means for monitoring the output of said means for supplying electrical current, means for deriving from said monitored current a correction signal proportional to said current and equal in magnitude to said error, and means for applying said correction signal to said feedback loop at a point in said feedback loop before said means for supplying current, in order to cancel said error.

4,008,388

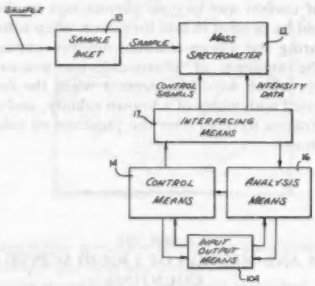
MASS SPECTROMETRIC SYSTEM FOR RAPID, AUTOMATIC AND SPECIFIC IDENTIFICATION AND QUANTITATION OF COMPOUNDS

Fred W. McLafferty, Ithaca, N.Y.; Robert H. Hertel, Pasadena, and Robert D. Villwock, Glendora, both of Calif., assignors to Universal Monitor Corporation, Pasadena, Calif.

Continuation of Ser. No. 470,642, May 16, 1974, abandoned. This application Aug. 4, 1975, Ser. No. 601,825

Int. Cl.² G06F *15/52*; **G06G** *7/74*

U.S. Cl. 235—151.35 **46 Claims**



1. In a mass spectrometric system comprised of (i) means for measuring the mass spectra of sample compounds; (ii) means for introducing a sample of a pure compound or a mixture of compounds into said measuring means; (iii) means for controlling the operation of said measuring means so as to measure the intensities of one or more mass peaks of said sample; and (iv) means for data input and output electrically coupled to said control means and to means for analyzing said mass peaks, said analysis means comprising:

a. first means for storing the mass spectrum of at least one target compound or a contracted mass spectrum thereof;

b. second means for storing at least one spectral matching criterion;

c. means for matching said measured mass peaks to corresponding mass peaks of said stored spectrum of said target compound on a probabilistic basis, the degree of said matching being determined with respect to said spectral matching criterion, said matching means being electrically coupled to said first and second storage means and to said measuring means,

whereby, said target compound is identified as being present in said sample or as not being present therein in accordance with said spectral matching criterion.

4,008,389

APPARATUS FOR CHECKING THE OPERATION OF CONTROL CIRCUITS

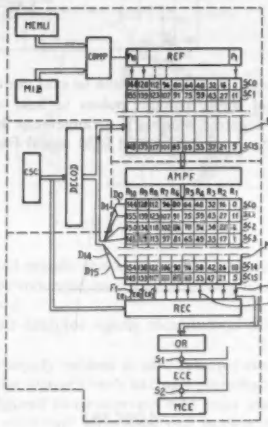
Jean-Pierre Brunin, Belfort, and Jean-Marc Thomas, Valdoie, both of France, assignors to Compagnie Honeywell Bull (Societe Anonyme), Paris, France

Continuation-in-part of Ser. No. 503,114, Sept. 4, 1974, abandoned. This application Oct. 3, 1975, Ser. No. 619,251

Claims priority, application France, Sept. 5, 1973, 73.32061

Int. Cl.² G06F *11/00*

U.S. Cl. 235—153 AS **8 Claims**



1. Apparatus for checking the operation of N control circuits, each including detector means for generating an error signal in response to erroneous operation, the control circuits being divided into *m* groups with k control circuits in each group, said apparatus comprising:

N gate means for transmitting an error signal when enabled;

first conductor means for operatively connecting each detector means to a different gate means so that the gate means are divided into *m* groups with k gates in each group;

first selection means for individually enabling a different one of the *m* groups of control circuits and the gates connected to the detector means of the enabled control circuits during *m* sub-cycles of operation;

second selection means for selecting for operation during each sub-cycle not more than k control circuits; and

error indicator means for receiving error signals transmitted by the gate means when enabled by the first selection means and for indicating the erroneous operation of one or more of the control circuits.

4,008,390

OPTICAL PULSE TRANSMISSION SYSTEM

Peter Klaus Runge, Fair Haven, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

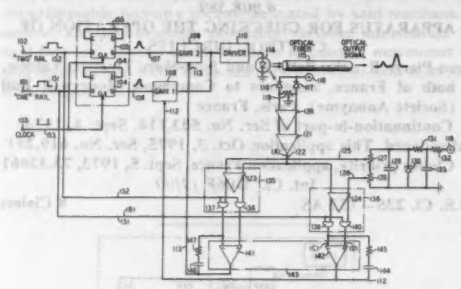
Filed Mar. 15, 1976, Ser. No. 666,579

Int. Cl.² H04B *9/00*; **G01J** *1/32*; **G05D** *25/02*

U.S. Cl. 250—199 **10 Claims**

1. An optical system for transmitting input voltage pulses comprising an optical source for producing a light signal in response to an electrical signal applied thereto, an optical transmission medium having one end disposed adjacent to said optical source for receiving the produced light signal, a light detector in close proximity to said optical source for collecting

light emitting from said optical source and for converting the collected light to a first developed signal, means for developing a second signal in response to the electrical signal applied to said optical source, means for subtracting the developed second signal from said first developed signal to produce a



control voltage, means responsive to said control voltage for coupling said input voltage pulses to said optical source, whereby a negative feedback arrangement is provided for control of the intensity of said light signal from said optical source.

4,008,391

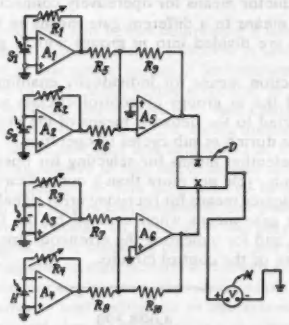
DEVICE FOR MEASURING LIGHTING EFFECTIVENESS

Alfred J. Henderson, Jr., Hendersonville, N.C., assignor to General Electric Company, New York, N.Y.

Filed Nov. 12, 1975, Ser. No. 631,096

Int. Cl.² H01J *39/12*

U.S. Cl. 250—208 **9 Claims**



1. A device for measuring quality of illumination comprising, in combination, first and second light sensing means, first and second circuit means respectively associated with said first and second light sensing means for producing respective outputs proportional to the arithmetic sum of illumination levels on the respective first and second light sensing means, electronic means connected to the outputs of said first and second circuit means for performing an arithmetic division on the same, and indicating means connected to said electronic means for displaying the resultant output of said electronic means.

4,008,392

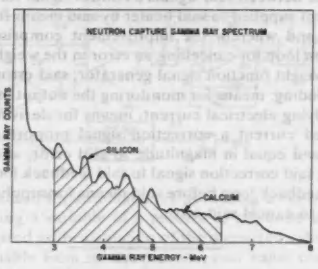
METHOD FOR DETERMINING FLUID TYPE AND LITHOLOGY OF SUBTERRANEAN FORMATIONS

George A. Lock, and Wilmer A. Hoyer, both of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Continuation of Ser. No. 398,623, Sept. 19, 1973, abandoned. This application Dec. 26, 1974, Ser. No. 536,525

Int. Cl.² G01V *5/00*

U.S. Cl. 250—270 **1 Claim**



1. A method of determining the presence of natural gas in a subterranean formation which comprises placing a source of high energy neutrons within the borehole at the level of a subterranean formation having a fluid content with known salinity, generating a pulse of high energy neutrons, detecting gamma rays resulting from inelastic scattering reactions during said neutron pulse, terminating said neutron pulse, detecting gamma rays resulting from neutron capture reactions subsequent to termination of said neutron pulse, determining the relative amounts of inelastic gamma rays at energy levels indicative of carbon and oxygen, determining the relative amounts of neutron capture gamma rays at energy levels indicative of silicon and chlorine, comparing the relative amounts of carbon and oxygen gamma rays to the amounts which would be present in said formation when saturated with oil, comparing the silicon-chlorine neutron capture gamma rays to the amounts of silicon-chlorine neutron capture gamma rays which would be present when the formation is fully saturated with water of a known salinity, and correlating the comparisons to determine the presence of natural gas in the formation.

4,008,393

SYSTEM AND METHOD OF LIQUID SCINTILLATION COUNTING

Edward Rapkin, Short Hills, N.J., assignor to Intertechnique S.A., Plaisir, France

Filed Sept. 11, 1970, Ser. No. 71,613

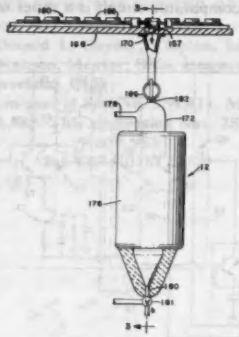
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976

Int. Cl.² G01T *1/00*

U.S. Cl. 250—328 **37 Claims**

1. A liquid scintillation counting system comprising (a) a combustion chamber for combusting radioactive samples; (b) conveying means for retaining a multiplicity of said radioactive samples in storage and for conveying said radioactive samples from said storage into said combustion chamber in sequence so that each sample enters said chamber when said chamber is ready for a new sample; (c) means for collecting from said combustion chamber combustion product resulting from the combustion of each sample and retaining said product in a liquid scintillator to provide at least one test sample corresponding to each radioactive sample combusted; and (d) a detecting means communicating with said collecting means, receiving and counting said test samples, said conveying means comprising a horizontally oriented link chain posi-

tioned directly above a horizontally oriented flat plate containing a single aperature, said link chain defining a series of



compartments, each compartment being open at the top and bottom and being sized to hold a sample.

4,008,394

GAS ANALYZING

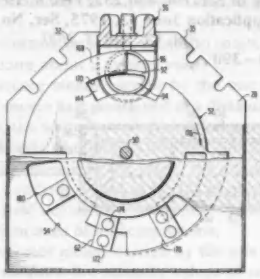
Ojars Risgin, Grass Lake, and Charles B. Arnold, Saline, both of Mich., assignors to Sensors, Inc., Ann Arbor, Mich.

Filed June 28, 1973, Ser. No. 374,553

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² G01N *21/00*

U.S. Cl. 250—345 **18 Claims**



1. Gas analyzing structure for use in simultaneously performing multiple gas anaylses comprising

frame means supporting a plurality of individual optical gas anaylsis assemblies located to dispose portions of each such assembly along an arcuate path,

each such assembly of said plurality of assemblies including a single source of radiant energy, a single radiant energy detector having an electrical output, means for directing the radiant energy from the single source for passage along a sample gas and a reference gas path, and means for directing such radiant energy after passage along the reference gas and sample gas paths to the single detector for such radiant energy,

means for predetermined cyclic interruption of radiant energy in the sample and reference gas paths of each such assembly including a single chopper disc rotatable about a fixed central axis located in predetermined positional relationship to the arcuate path disposition of gas analysis assemblies,

the chopper disc including a plurality of windows predeterminedly spaced radially from the fixed central axis with a portion of the windows being spaced from the central axis a predetermined distance to permit passage of radiant energy in the sample gas path and a portion of the windows being spaced radially from the central axis to permit passage of radiant energy in the reference gas path of each optical gas analyzer assembly upon rotation of the chopper disc about the fixed central axis, and

said radiant energy detector of each of said assemblies being adapted to be connected to circuitry for processing the electrical output of a detector.

4,008,395

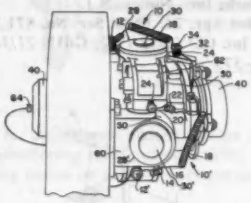
FLEXIBLE TUBE SECTION FOR GIMBALLED IR DETECTORS

Herbert B. Ellis, Pasadena, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 2, 1974, Ser. No. 494,101

Int. Cl.² G01J *1/00*

U.S. Cl. 250—352 **4 Claims**



1. An infrared missile seeker assembly comprising:

a. a telescope mounted on a gimbal having inner and outer gimbal axes;

b. an infrared detector rigidly mounted on said telescope; and

c. means for supply coolant to said detector comprising two flexible tube sections each having a plurality of individual coils configured to circumvent said inner and outer gimbal axes, each said individual coil having a low spring constant, thus minimizing any resultant torque on said gimbal.

4,008,396

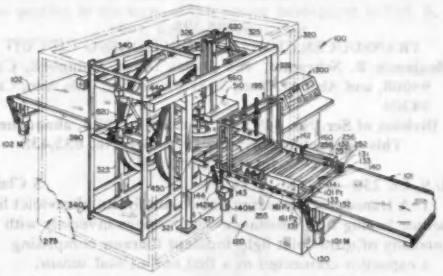
TIRE INSPECTION SYSTEM

Phillip K. Loyer, Waynesville, N.C., assignor to Picker Corporation, Cleveland, Ohio

Division of Ser. No. 495,493, Aug. 7, 1974. This application Aug. 13, 1975, Ser. No. 604,331

Int. Cl.² G01N *23/00*

U.S. Cl. 250—358 T **24 Claims**



1. In an apparatus for inspecting tires through the use of penetrative emanation, of the type including a penetrative emanation shielded enclosure which houses a penetrative emanation tire inspection system, an inlet opening for admitting tires to be inspected to said enclosure, and an outlet opening for discharging inspected tires, the improvement of a pair of closure systems for closing each of said openings, each of said closure systems comprising:

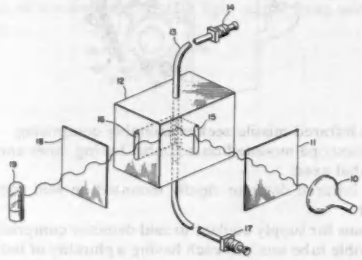
a. a pair of doors formed from penetrative emanation impervious material;
b. means mounting said doors for movement toward each other from positions on opposite sides of their associated opening to close said opening, and for movement from each other to open said opening;
c. drive means operably connected to said doors to concurrently move said doors toward and away from each other to close and open said opening;
d. one of said doors having a penetrative emanation impervious lip which overlaps the juncture between said doors when said doors are closed to prevent the passage of penetrative emanation through said juncture.

4,008,397

FLUOROMETER FLOW CELL

Joseph John Zdrodowski, Bricktown, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Apr. 24, 1975, Ser. No. 571,147
Int. Cl.² G01J *1/42*; G01N *21/38*
U.S. Cl. 250—373 **4 Claims**



1. In a fluorometer consisting of
A. light source means;
B. excitation filter means;
C. cell holder means;
D. emission filter means; and,
E. photo detector means,
the improvement which comprises providing said cell holder means with a flow cell consisting of polyfluoroethylene tubing which is in operative optical relationship with said light source, said excitation filter means, said emission filter means and said detector means.

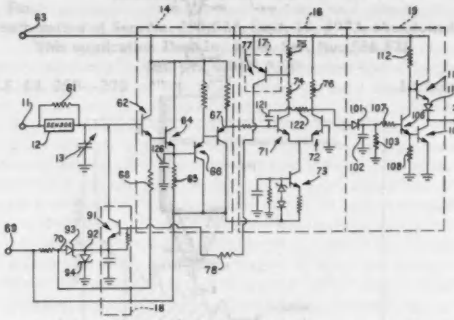
4,008,398

TRANSDUCER SIGNAL CONDITIONING CIRCUIT

Benjamin B. Schramm, 426 Dallas Drive, Campbell, Calif. 95008, and Alan M. Paul, 3031 Bryant St., Palo Alto, Calif. 94306

Division of Ser. No. 449,842, March 11, 1974, abandoned. This application Nov. 19, 1975, Ser. No. 633,438
Int. Cl.² G01J *1/42*
U.S. Cl. 250—372 **5 Claims**

1. A transducer measurement circuit for an ultraviolet light sensor having high resistance which varies inversely with the intensity of ultraviolet light incident thereon comprising
a capacitor connected to a first end of said sensor,
a source of electrical power connected to a second end of said sensor whereby said capacitor is adapted to be discharged through the variable resistance of said sensor,
a comparator circuit biased to conduct at a predetermined input voltage threshold and having an input connected to the juncture of said sensor and capacitor for initiating conduction of said comparator circuit at a capacitor voltage equal to said predetermined threshold voltage,
a transistor switch connected across said capacitor and connected to said comparator circuit for conduction upon conduction of said comparator circuit to recharge said capacitor and thus turn off said comparator circuit and complete a feedback loop, whereby the output of said differential comparator circuit is a series of pulses, and



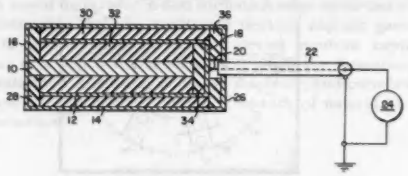
processing means connected to the output of said comparator circuit for processing the pulses as a measure of sensor resistance.

4,008,399

GAMMA COMPENSATED, SELF POWERED NEUTRON DETECTOR

Donald P. Brown, Richland, Wash., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Continuation of Ser. No. 440,232, Feb. 6, 1974, abandoned. This application June 13, 1975, Ser. No. 586,698
Int. Cl.² G01T *3/00*
U.S. Cl. 250—390 **11 Claims**



1. An improved, self-powered, gamma compensated, neutron detector comprising:
an emitter constructed from a material which is responsive to neutron bombardment to provide a beta emission with a representative intensity corresponding to the intensity of the neutron bombardment;
an electrically conductive sheath positioned concentrically around said emitter;
means for maintaining said emitter and sheath at a common potential;
an electrically conductive collector positioned concentrically around said emitter, arranged between said sheath and emitter and electrically insulated therefrom, said sheath is constructed to provide an intensity of Compton scattered electron emissions as a result from gamma interaction with the sheath materials that will impart in the collector a current substantially equal and opposite in magnitude to the net gamma induced current imparted in the collector as a result of Compton scattered electron emissions from the collector materials; and
an electrical connector having a first electrical conductor coupled to said collector and insulated from said sheath and emitter, and a second electrical conductor communicating with said emitter and sheath.

4,008,400

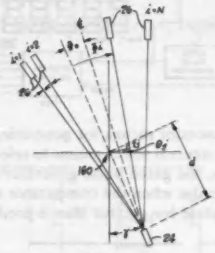
TRANSVERSE TOMOGRAPHY SYSTEM HAVING MULTIBEAM ORBITAL SCANNING WITH ALL BEAMS OFFSET FROM THE CENTER OF ORBIT

Carl J. Brunnett, Mayfield Heights, Ohio; Jerome R. Cox, Jr., St. Louis; Donald L. Snyder, Clayton, both of Mo., and Rodney A. Mattson, Mentor, Ohio, assignors to Picker Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 559,411, March 18, 1975, Pat. No. 3,976,885. This application Nov. 28, 1975, Ser. No. 635,952

Int. Cl.² G01M 23/00

U.S. Cl. 250—445 T 41 Claims



1. Transverse section scanning apparatus for scanning coplanar points of a body with a set of beams of X-radiation, having axes substantially in a plane containing the points, comprising:

a. a support structure including means to rotate one section of the structure about a system axis;

b. radiation source means carried by the one section and including a source axis positioned at a distance *d* from the system axis, the source means being for providing a plurality of N beams of radiation directed substantially radially of the source axis in the plane, the outermost beams subtending a radiation field of $N-1/2\ \alpha°$ on either side of a radiation field center line, where α is the angular separation between axes of adjacent beams;

c. radiation detector means carried by the one section and adapted to measure the intensity values of said beams;

d. said one section maintaining said radiation source means and said radiation detector means in spaced alignment about the system axis as a study is conducted, said support structure further including:

i. offsetting means for relatively positioning said radiation source means and said radiation detector means such that said field line center is displaced a predetermined distance D from said source axis to offset all beams of radiation from said system axis;

ii. the support structure including orbiting means for rotating the one section, the radiation source means and the radiation detector means through substantially a one revolution orbital path about the system axis during the study, and for maintaining the distance D substantially constant during an orbit of the source means and the detector means; and,

e. data collection means, including said radiation detector means, for collecting values of intensities of said beams at predetermined orbital positions of said radiation source means and radiation detector means as about said orbital center, wherein said displacing said field line center by said predetermined distance D allows the collection of nonduplicate data throughout the substantial orbit of one revolution.

4,008,401

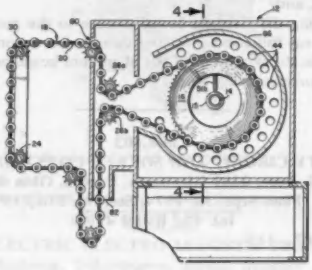
U. V. CURING SYSTEM

George H. Holoubek, and Henry A. Burzlaff, both of Muscatine, Iowa, assignors to Dart Industries Inc., Los Angeles, Calif.

Filed Oct. 1, 1975, Ser. No. 618,702

Int. Cl.² G01M 21/00

U.S. Cl. 250—453 9 Claims



8. A method for curing resin coated articles comprising:

successively positioning resin coated articles upon stationary mounting means on an endless conveyor outside of a housing;

aligning said articles so that the longitudinal axis thereof is parallel and coextensive with the longitudinal axis of an elongated radiation source;

conveying said articles into the housing; and,

revolving said articles about a curved pathway located concentric with the longitudinal axis of said radiation source and in a plane perpendicular to said axis;

simultaneously maintaining said articles stationary on said mounting means thereby exposing substantially the entire exterior surfaces of said articles to direct radiation from said radiation source;

curing said resin; and,

conveying said articles outside the housing for removal from said mounting means.

4,008,402

METHOD AND APPARATUS FOR ELECTRON BEAM ALIGNMENT WITH A MEMBER BY DETECTING X-RAYS

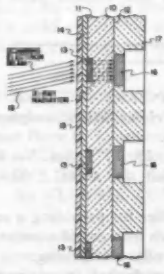
Terrence W. O'Keeffe, and Alan J. Simon, both of Pittsburgh, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 18, 1974, Ser. No. 489,638

The portion of the term of this patent subsequent to Oct. 8, 1991, has been disclaimed.

Int. Cl.² H01J 29/50, 31/49

U.S. Cl. 250—492 A 16 Claims



1. A method of precision aligning an electron beam with selected areas of a major surface of a member comprising the steps of:

A. forming adjacent a major surface of a member a plurality of marks of predetermined shape capable of generating x-ray radiation on irradiation by an electron beam corresponding to the area of the mark irradiated;

B. irradiating at least one of the marks with a corresponding alignment beam portion of an electron beam to be aligned, said alignment beam portion having a predetermined cross-sectional shape;

C. detecting x-ray radiation emissions from said irradiated mark; and

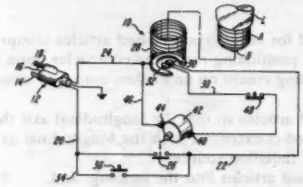
D. moving the electron beam relative to the member until the x-ray radiation emissions detected in accord with step C indicate alignment of the alignment beam portion with the corresponding mark.

4,008,403

SAFETY CIRCUIT AND SOCKET CONSTRUCTION

Manning I. Rose, 2301 Glenheath, Dayton, Ohio 45440

Filed Sept. 30, 1974, Ser. No. 510,215
Int. Cl.² H01H 47/00
U.S. Cl. 307—113 **11 Claims**



1. In apparatus for connecting electrical load devices having two terminals to an electrical energy source of the type having a socket having first contact means for engaging one of said terminals and second contact means for engaging the other of said terminals, circuit means including a make switch which, when said make switch is closed, is adapted to operatively connect said socket to an electrical energy source, and electrically operable means adapted to be energized upon closure of said make switch, the improvement wherein said make switch is a normally open momentary switch, said circuit means includes a holding switch closed when said electrically operable means is energized so that said socket is operatively connected to the source, and wherein one of said socket contact means comprises two contact parts that are electrically interconnected when a load device is in said socket and electrically unconnected when no load device is in said socket, said two contact parts being electrically connected to said electrically operable means and the source so that said electrically operable means will be in an energized state when said momentary make switch is opened only if said two contact parts are electrically interconnected when said make switch is closed and only so long as said two contact parts remain electrically interconnected.

4,008,404

INTERVAL TIMER

Donald S. Foreman, Fridley, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 29, 1975, Ser. No. 644,669
Int. Cl.² G08G 1/07
U.S. Cl. 307—149 **13 Claims**

1. A traffic controller for providing a set of traffic control output signals for each interval of a sequence of timed intervals, the traffic controller comprising:

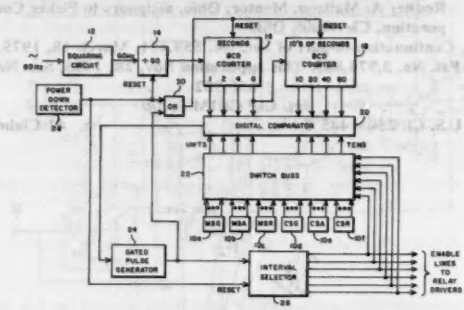
interval select means for selecting a particular interval, the selected interval having an associated set of traffic control output signals;

clock means for producing clock signals;

counter means for counting in response to the clock signals;

interval timing means for providing for each selected interval, a number indicative of a desired time duration of the selected interval;

comparator means for switching from a first to a second state when the count of the counter equals the number provided by the interval timing means; and



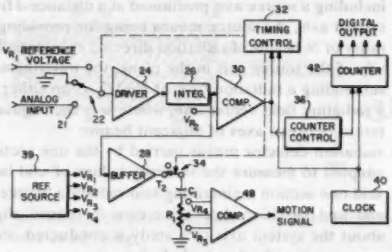
gated pulse generator means for generating a control pulse to cause the interval select means to select another one of the intervals, the gated pulse generator means providing the control pulse when the comparator means remains in the second state for greater than a predetermined time.

4,008,405

MOTION DETECTION CIRCUIT FOR ELECTRONIC WEIGHING SYSTEM

Leopold Neumann, Lexington, and Bernard M. Gordon, Magnolia, both of Mass., assignors to Analogic Corporation, Wakefield, Mass.

Filed June 5, 1975, Ser. No. 584,052
Int. Cl.² H03K 5/20, 5/153
U.S. Cl. 307—231 **6 Claims**



1. For use in an electronic digitizer, circuitry for detecting the rate of change of an analog input signal and providing a digital logic signal representation thereof, comprising:

a dual-slope analog-to-digital converter operative in successive conversion cycles and having an integrator which integrates the analog input signal during a fixed-length sampling interval and which integrates a reference signal during a variable-length second interval, the ratio of the two intervals being digitally determined to provide a digital representation of the magnitude of the analog input signal;

means for storing an analog representation of the output signal from the integrator of the dual-slope converter between the sampling and second intervals of a first conversion cycle;

means operative in response to the stored analog representation and to the integrator output between the sampling and second intervals of a second conversion cycle succeeding said first conversion cycle for producing a signal representative of the difference therebetween;

means for providing a predetermined reference threshold; and

means for comparing said reference threshold with said difference signal to provide a digital output signal indicative of whether the rate of change of the analog input signal falls within preselected limits as determined by the reference threshold.

4,008,406

ELECTRONIC CIRCUIT USING FIELD EFFECT TRANSISTOR WITH COMPENSATION MEANS

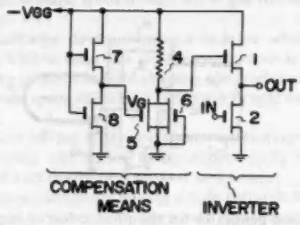
Hiroto Kawagoe, Kodaira, Japan, assignor to Hitachi, Ltd., Japan

Filed Sept. 11, 1975, Ser. No. 612,354

Claims priority, application United Kingdom, Nov. 7, 1974, 48264/74

Int. Cl.² H03K *3/353, 17/14, 19/08, 19/40*

U.S. Cl. 307—304 **18 Claims**



1. In an electronic circuit having

first and second field effect transistors connected in series between a terminal for connecting a source of reference potential and a terminal for connecting a power supply source thereto,

a third field effect transistor, the source electrode of which is connected to said reference potential terminal, the gate electrode of which is connected to a bias voltage terminal, and the drain electrode of which is connected to the gate electrode of said second field effect transistor,

a resistor connected between the drain electrode of said third field effect transistor and said power supply source terminal,

the improvement comprising:

first resistance means connected between said power supply source terminal and the gate electrode of said third field effect transistor for supplying said bias voltage to the gate of said third field effect transistor for improving the third transistor's response to unfavorable voltage fluctuations of said power supply.

4,008,407

NUCLEAR THERMIONIC CONVERTER

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention by; Wayne M. Phillips, La Crescenta, and Jack F. Mondt, La Canada, both of Calif.

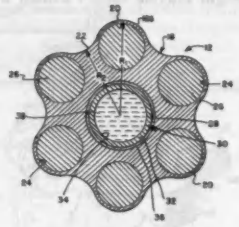
Filed Oct. 3, 1972, Ser. No. 294,727

Int. Cl.² H01J *45/00*

U.S. Cl. 310—4 R **5 Claims**

1. Thermionic reactor apparatus comprising:

a rod having a central passage with the walls thereat of emitting material, and having a plurality of fuel passages located between the central passage and the periphery of the rod, the periphery of said rod undulating in radius and having maximum radii along imaginary radial lines passing through the fuel passages and minimum radii along imaginary radial lines passing between adjacent fuel passages;



nuclear fuel disposed in said fuel passages; and

a collector disposed in said central passage.

4,008,408

PIEZOELECTRIC ELECTRO-ACOUSTIC TRANSDUCER

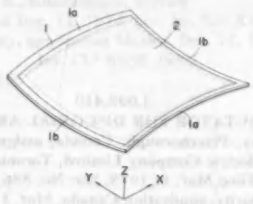
Akihiko Kodama, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Feb. 24, 1975, Ser. No. 552,140

Claims priority, application Japan, Feb. 28, 1974, 49-22866

Int. Cl.² H01L *41/08*

U.S. Cl. 310—9.1 **2 Claims**



1. A piezoelectric electro-acoustic transducer, comprising:

a piezoelectric diaphragm;

a rigid endless framelike support member surrounding an opening therethrough spanned by said diaphragm, said endless framelike support member being nonplanar and including a portion along its length which is curved generally in the direction of the axis of said opening, the perimetral edge of said diaphragm being attached to said endless framelike support member and following the curvature of said portion thereof, the surface of said diaphragm being correspondingly curved to a nonplanar condition by its edge attachment to said rigid nonplanar framelike support member so as to impart at least one of tension and resiliency to said diaphragm, said nonplanar frameline support member including opposed first side portions curved in one direction and opposed second side portions curved in the opposite direction, said diaphragm being held in a saddle-shape by such curvature of said first and second support member portions.

4,008,409

DYNAMOELECTRIC MACHINE CORE AND COIL ASSEMBLY

Ralph G. Rhudy, and Hans H. Casanova, both of Scotia, N.Y., assignors to General Electric Company, Schenectady, N.Y.

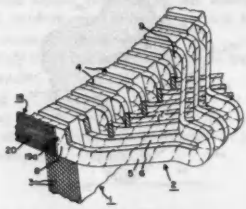
Filed Apr. 9, 1975, Ser. No. 566,454

Int. Cl.² H02K *15/12*

U.S. Cl. 310—45 **7 Claims**

1. A dynamoelectric machine core and coil winding assembly comprising a core stack of magnetic metal laminations formed with coil-receiving slots therein, an electrical winding of interconnected coils having their sides disposed, respectively, in said slots and having their end turns extending beyond the ends of the core stack, a rigid coating of insulating material disposed around each coil side to insulate the coils from the core stack, in combination with generally flat mats of semi-conducting material each having a plurality of ridges of

electrically semi-conductive, pressure-deformable room temperature vulcanizing silicone rubber bonded to one side thereof, said rubber bonded to the mats comprising 50 to 80 percent by weight silicone rubber loaded with 20 to 30 per-



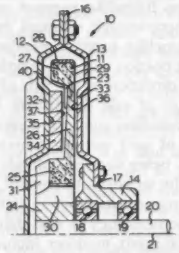
cent carbon powdered material, said mats being positioned respectively, one in each of said slots with the rubber coated side of each mat compressed against the side of a slot by the coil side mounted therein.

4,008,410

COMMUTATOR FOR DISCOIDAL ARMATURE

Eric Whiteley, Peterborough, Canada, assignor to Canadian General Electric Company Limited, Toronto, Canada

Filed Mar. 6, 1975, Ser. No. 556,117
Claims priority, application Canada, Mar. 13, 1974, 194870
Int. Cl.² H02K *13/04*
U.S. Cl. 310—237 **6 Claims**



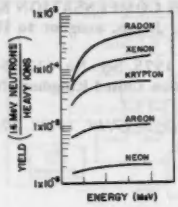
1. A discoidal armature for a dynamoelectric machine comprising a plurality of stranded coils disposed overlapping in a flat, circular array and bonded together by means of a strong, adherent, non-conductive bonding medium to provide a rigid discoidal structure having an annular disc portion containing the coil sides and integral with coaxial inner and outer ring portions containing the coil end-heads, each one of said coils having sides disposed radially at approximately one pole pitch and having the strands of the sides diverge in the plane of said disc portion from said inner ring portion to said outer ring portion so as to provide an annular disc portion having flat outer surfaces that converge from said inner ring portion to said outer ring portion; commutating means for said structure characterized by at least one annular array of commutator segments on said disc portion adjacent said outer ring portion and connected in circuit with said coils; and a strong, adherent, non-conductive bonding medium bonding said segments to said discoidal structure.

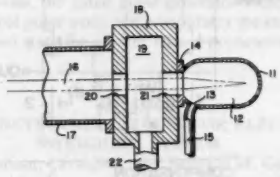
4,008,411

PRODUCTION OF 14 MEV NEUTRONS BY HEAVY IONS

Robert M. Brugger, Columbia, Mo.; Lowell G. Miller, and Robert C. Young, both of Idaho Falls, Idaho, assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 8, 1975, Ser. No. 594,166
Int. Cl.² H01J *39/22*
U.S. Cl. 313—61 R **9 Claims**





7. A neutron generator for the production of approximately 14 MeV neutrons comprising:

a. a target housing enclosing a target chamber and having therein an access port and a beam port;

b. means for introducing a deuterium-tritium mixture target into said target chamber through said access port;

c. means for accelerating heavy ions; and

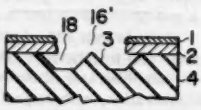
d. means for introducing said accelerated heavy ions into said target chamber through said beam port so as to impinge upon said mixture to produce recoil deuterons and tritons which interact with atoms of tritium and deuterium in said mixture to produce approximately 14 MeV neutrons.

4,008,412

THIN-FILM FIELD-EMISSION ELECTRON SOURCE AND A METHOD FOR MANUFACTURING THE SAME

Isamu Yuito, Hachioji; Kikuji Sato, Kokubunji, and Mikio Hirano, Ohme, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Aug. 18, 1975, Ser. No. 605,603
Claims priority, application Japan, Aug. 16, 1974, 49-93297
Int. Cl.² H01J *1/02*
U.S. Cl. 313—309 **19 Claims**

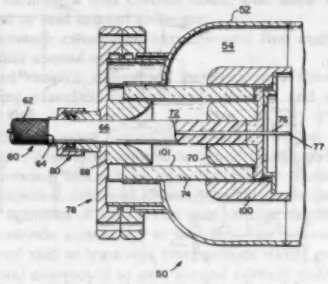


1. A thin-film field-emission electron source comprising a conductive substrate having a minute cavity, a needlelike emitter within said cavity, an insulating layer on the surface of said substrate except for the portion of said cavity, and a first anode layer on said insulating layer, wherein said emitter and said substrate are formed as a single body, and said insulating layer and said first anode layer overhang said cavity around the projection of said emitter except over said emitter.

4,008,413
COMPACT HIGH VOLTAGE FEEDTHROUGH FOR GAS DISCHARGE DEVICES

John R. Bayless, Malibu, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Mar. 3, 1975, Ser. No. 553,875
Int. Cl.² H01J 19/62
U.S. Cl. 313—331 4 Claims



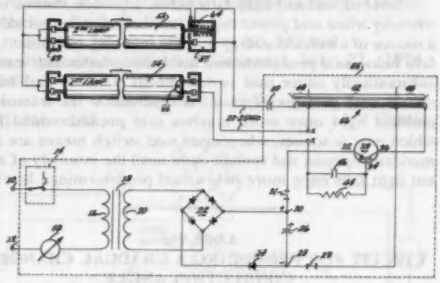
1. A high voltage feedthrough for a gas discharge device, comprising:
a gas discharge device having a hole in which a coaxial cable, with at least one center conductor, is inserted;
a plurality of electric field shaping electrodes with an interelectrode space therebetween, a gas in said interelectrode space;
said device having a horizontal axis extending through it;
said shaping electrodes being substantially cylindrically shaped and positioned around said axis;
said shaping electrodes having a hole through their centers, said cable extending through said holes; said cable being secured in place by said shaping electrodes;
ends on said shaping electrodes, which are perpendicular to said axis and face each other, having curved edges to prevent breakdown between said electrodes;
a high voltage electrode;
a tubular insulator between said high voltage electrode and said shaping electrodes, said insulator having an inner and an outer surface; said inner surface facing said shaping electrodes and said outer surface facing said high voltage electrode;
said insulator having a space between its inner surface and said shaping electrodes, gas being in said space to prevent breakdown between said shaping electrodes.

4,008,414
CIRCUIT FOR POWERING FLUORESCENT LAMPS

Donald L. Agnew, Long Beach, Calif., assignor to Power Saver Corporation, Bellflower, Calif.

Filed July 28, 1975, Ser. No. 599,378
Int. Cl.² H05B 41/24, 41/29
U.S. Cl. 315—97 14 Claims

1. Apparatus for powering first and second fluorescent lamps connected in series, said lamps each having a starter heater filament, comprising:
a. a pair of sockets associated with each lamp, each socket having a terminal for making electrical connection to a lamp, with one of the terminals associated with each lamp connected in common;
b. an oscillator including two output terminals each of which is connected to the terminal of a socket associated with a different lamp but not to the terminals connected in common, and further including a feedback circuit including means for connecting a starter heater filament of the first lamp in series within the feedback circuit, whereby removal of the first lamp from its sockets disables said oscillator; and
c. switching means for establishing a short circuit between the socket terminals of the second lamp when the lamp is removed from its sockets, whereby the socket terminals of the socket lamp are bypassed permitting power to

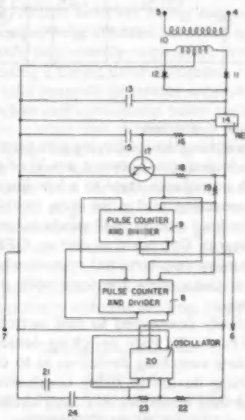


continue to be applied to the socket terminals of the first lamp after the second lamp has been removed from its sockets.

4,008,415
PHOTOCONTROL FOR ELECTRIC LAMPS

Antonio De Avila-Serafin, and Francisco Javier Diaz-Romo, both of Guadalajara, Mexico, assignors to Electrotec de Occidente, S.A., Guadalajara, Mexico

Filed Dec. 11, 1974, Ser. No. 531,835
Claims priority, application Mexico, Dec. 14, 1973, 148214
Int. Cl.² H05B 39/02
U.S. Cl. 315—156 5 Claims



1. A photocontrol system, comprising:
a. circuit means having power supply terminals for connection with a source of electrical energy and load terminals for connection with an electrical load;
b. switch means connected in the circuit means to control supply of current to the load terminals;
c. electrical means controlling operation of said switch means;
d. solid state electronic timer means connected between the load terminals and comprising a pulse generator which generates pulses at a predetermined frequency, beginning when current is supplied to the load terminals, and counting means which count the pulses generated by the pulse generator and provide an output signal when a preset count has been reached after beginning counting;
e. control means connected to respond to said output signal by causing said electrical means to bring about opening of the switch means; and

f. photoelectric means respective to the intensity of ambient light to cause the electrical means to maintain the switch means open independently of said control means until the level of ambient light falls below a predetermined level, whereby when said power supply terminals are connected with a source of electrical energy and the intensity of ambient light falls below said predetermined level, said photoelectric means automatically cause said switch means to close and remain closed until said preset count is reached or the intensity of ambient light once more reaches said predetermined level, which ever is sooner, whereupon said switch means are automatically opened and remain open until the intensity of ambient light falls once more below said predetermined level.

4,008,416

CIRCUIT FOR PRODUCING A GRADUAL CHANGE IN CONDUCTION ANGLE

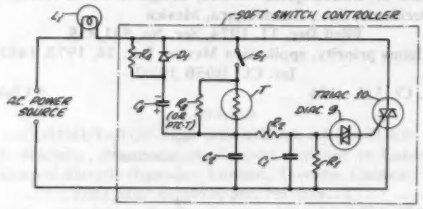
Henry H. Nakasone, 1672 Camrose Way, Anaheim, Calif. 92802

Continuation-in-part of Ser. No. 364,693, May 29, 1973, Pat. No. 3,898,516. This application July 14, 1975, Ser. No. 595,585

The portion of the term of this patent subsequent to Aug. 5, 1992, has been disclaimed.

Int. Cl.² H05B *39/02*

U.S. Cl. 315—194 **7 Claims**



1. A soft switch comprising:

a solid state switching device having gate terminal means for altering the impedance between a paid of main terminals from a high impedance state to a low impedance state;

means for connecting said solid state switching device in series with a load and an A-C power source;

a switch having an ON position and an OFF position said switching having one terminal operatively connected to the junction connecting the load with said solid state switch device;

means operatively connected to said switch and the gate terminal of said solid state switching device for actuating said solid state switching device so as to cause said solid state switching device to delay conduction beyond the peak of the first complete A-C half cycle following the closure of said switch to the ON position, and

for causing said solid state switching device to smoothly and progressively increase its conduction duration with each half cycle of the A-C source following the initial conduction.

4,008,417

PHASE LOSS DETECTOR

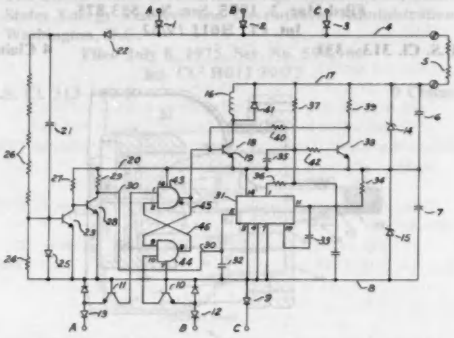
James P. Donovan, Louisville, Ky., assignor to General Equipment and Manufacturing Company, Inc., Louisville, Ky.

Continuation-in-part of Ser. No. 492,542, July 29, 1974, abandoned. This application Sept. 26, 1975, Ser. No. 616,911

Int. Cl.² H02H *3/24*

U.S. Cl. 361—53 **5 Claims**

1. In a circuit to detect improper voltages on a multiphase A.C. power line, in combination, a multiphase full wave diode bridge rectifier having its input arranged to be connected to the power lines to be monitored and having output terminals, a resistance load connected across the output terminals of the bridge rectifier whereby current flows continuously therethrough, a condenser and a first resistor connected in series across said output terminals, a discharge resistor connected across the condenser, a monostable multivibrator having a



timing interval less than the time interval of one cycle of the ripple voltage of the bridge rectifier, means for triggering the multivibrator in response to current flow in said first resistor, a relay, and switching means connected to the multivibrator arranged to energize the relay according to the time the multivibrator is in its unbalanced state.

4,008,418

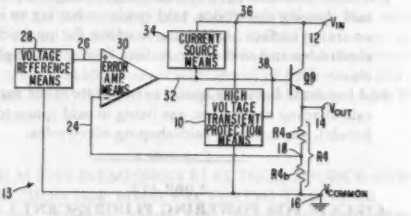
HIGH VOLTAGE TRANSIENT PROTECTION CIRCUIT FOR VOLTAGE REGULATORS

Howard E. Murphy, Redwood City, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Filed Mar. 2, 1976, Ser. No. 663,017

Int. Cl.² H02H *3/28*

U.S. Cl. 361—18 **9 Claims**



7. An improved series pass voltage regulator of the type possessing an input terminal, an output terminal, a common terminal and a series pass transistor having an emitter, a collector and a base, said emitter and said collector operatively connected across said input and said output terminals, a voltage divider having an intermediate voltage tap connected across said output and said common terminals, a current source connected between said input terminal and said base, an error amplifier having an output connected to said base, one input connected to said intermediate voltage tap and another input connected to a voltage reference, wherein the improvement comprises:

a first NPN transistor having an emitter, a collector and a base, said emitter and said collector of said first transistor operatively connected between said base of said series pass transistor and said common terminal; and

means connected between said input terminal and said base of said first transistor for biasing said first transistor into conduction in response to a voltage transient applied at said input terminal whose magnitude exceeds a selected

value, whereby said base of said series pass transistor is protectively coupled to said common terminal during said voltage transient, said means including

a second NPN type transistor having an emitter, a collector and a base, said second emitter connected to said first base;

a third PNP type transistor having an emitter, a collector and a base, said third collector connected to said second base forming a first control node, said third base connected to said second collector;

a first resistor connected between said first control node and said second emitter;

a second resistor connected between said third emitter forming a second control node thereat and said third base; and

a plurality of zener diodes connected in series, anode to cathode, possessing an end anode terminal, an end cathode terminal and at least one intermediate diode connection terminal, said end anode terminal connected to said input terminal of said series pass voltage regulator, said end cathode connected to said first control node and a selected said at least one intermediate diode connection terminal connected to said second control node.

4,008,419

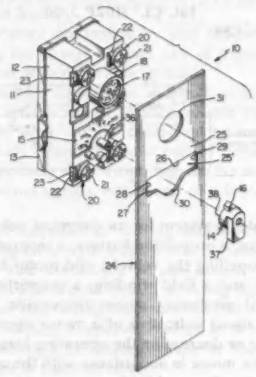
SHIELDED CONTROL DEVICE THEREFOR

John W. Stearley, Indiana, Pa., assignor to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 490,511, July 22, 1974, Pat. No. 3,914,660. This application Aug. 4, 1975, Ser. No. 601,515

Int. Cl.² H02B *1/04*

U.S. Cl. 361—334 **3 Claims**



1. A substantially flat protective shield for a control device having a housing provided with a selector knob and dial arrangement adjacent said knob as well as electrical terminal means adjacent said knob and dial arrangement, said protective shield being adapted to be secured to said control device and cover said terminal means, said shield having opening means therethrough adapted to expose said dial arrangement and have said selector knob project therethrough so that a tongue portion of said knob can overlap said shield to hold said shield to said control device, said opening means being substantially rectangular to define two pair of opposed side edges bordering said opening means, one of said opposed side edges of one pair of side edges having a concave portion thereof adapted to face said knob and complement the telescoping portion of said knob, said shield comprising a flat blank of electrical insulating material having opposed flat parallel sides without any projections therefrom.

4,008,420

SWITCHABLE HIGH-FREQUENCY MAGNETIC ROTARY FIELDS

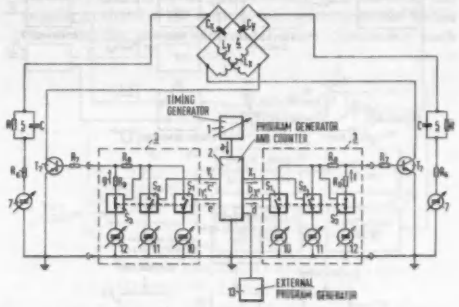
Franz Navratil, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed July 21, 1975, Ser. No. 597,664

Claims priority, application Germany, July 22, 1974, 2435245

Int. Cl.² H01H *47/00*

U.S. Cl. 361—153 **4 Claims**



1. An arrangement for producing a switchable high frequency magnetic rotary field, comprising:

a pair of crossed coils; a separate capacitance connected across each of said coils to form respective parallel resonant circuits,

each resonant circuit having in series therewith a timing device, a controllable voltage source and a resonant circuit switch,

said resonant circuit switches being triggerable by fixed phase pulses and pulse successions which are displaced by 90° therewith, respectively, a program generator,

means for feeding a timing pulse succession to said program generator, said program generator supplying starting and stopping pulses and operational pulse successions,

each resonant circuit switch including first and second switching stages coupled in parallel with each other, the first switch stage being responsive to the starting and stopping pulses from the program generator,

the second switch stage being responsive to the operation pulse succession from the program generator,

controllable voltage sources of like polarity being connected in series with each of said first and second switching stages, and means for superimposing a direct voltage of opposite polarity onto the starting, stopping and operation pulses.

4,008,421

METHODS AND APPARATUS FOR SPEED-CONTROL OF INDUCTION MOTORS

Brian Michael Bird, Bristol, England, assignor to National Research Development Corporation, England

Filed Jan. 31, 1975, Ser. No. 546,113

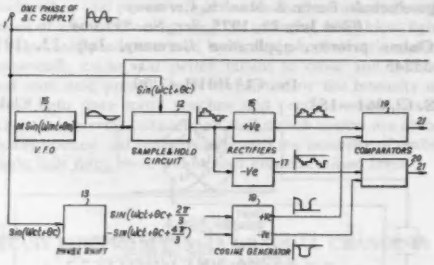
Claims priority, application United Kingdom, Feb. 1, 1974, 4768/74

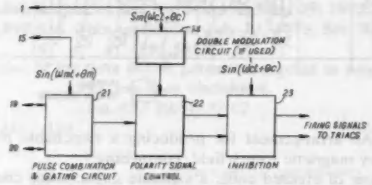
Int. Cl.² H02P *5/34*

U.S. Cl. 318—171 **10 Claims**

1. A method for energising an alternating current motor, of induction motor or synchronous motor type, for controlling the running speed thereof in continuously-variable manner, deriving energising current from an alternating current supply of fixed supply frequency, comprising generating a sinusoidal modulating wave of continuously-variable frequency lower than the said supply frequency, sampling the amplitude of the said modulating wave once during each half cycle of the alternating current supply and deriving a stepwise alternating modulating wave of the same modulating wave frequency, deriving therefrom a full-wave rectified, stepwise varying

modulating wave, comparing the instantaneous amplitudes of said rectified, stepwise varying modulating wave and a cosine wave of supply frequency and of equal maximum amplitude as





said modulating wave and switching said energising current to flow solely during those intervals between equality of the two said waves and the next following zero amplitude time of the said cosine wave.

4,008,422

FRACTIONAL HORSEPOWER BRUSHLESS DIRECT CURRENT MOTOR

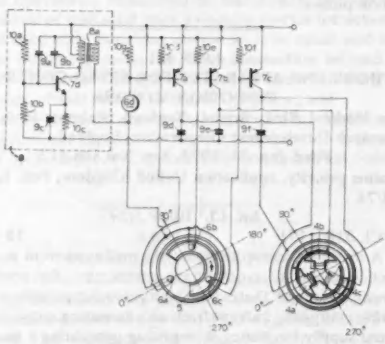
Kinzo Sodekoda, Omiya, and Norikazu Taguchi, Shobumachi, both of Japan, assignors to Tanaka Instrument Co., Ltd., Yono, Japan

Filed Oct. 18, 1974, Ser. No. 516,197

Claims priority, application Japan, Mar. 18, 1974, 49-18500; Feb. 18, 1974, 49-18501; Feb. 18, 1974, 49-18551[U]

Int. Cl.² H02K *29/00*

U.S. Cl. 318—138 **10 Claims**



1. A brushless direct current fractional horsepower motor, comprising in combination:

a housing and a cover therefor;

a stator within the housing having three stationary windings arranged around the periphery of the motor;

a permanently magnetized rotor rotatable therebetween;

detector means around said rotor for detecting the position of said rotor relative to said stator windings, said detector means comprising three detecting coils fixed on said stator and a rotational sector-shaped transducer rotatable with said rotor past said coils;

a resistor in series with each detecting coil;

a dummy coil spaced from said rotor and a further resistor in series therewith;

a source of high frequency alternating current connected in parallel to the respective series connected coils and resistors;

three switching transistors having the collectors coupled to the stationary windings, having the bases connected to the junctions between the detecting coils and associated resistors and having the emitters connected in common to the junction between the dummy coil and further resistor; and

a source of power across which the emitters of the switching transistors and the three stationary windings are coupled in parallel.

4,008,423

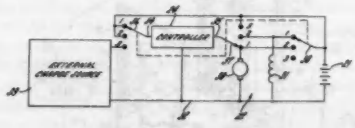
ELECTRICALLY PROPELLED VEHICLE

Clinton C. Christianson, Minnetonka, Minn., and Robert F. Bourke, Wilson, Wis., assignors to Gould Inc., Rolling Meadows, Ill.

Filed Feb. 11, 1975, Ser. No. 548,911

Int. Cl.² H02P *5/06*

U.S. Cl. 318—139 **26 Claims**

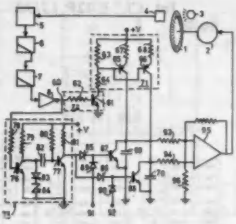


1. A propulsion system for an electrical vehicle comprising in combination, a propulsion battery, a separately excited d.c. motor for propelling the vehicle, said motor having an armature winding and a field winding, a proportional controller, control signal producing means responsive to a command signal and a signal indicative of a motor operating condition for increasing or decreasing the operating level of the controller to drive the motor in accordance with the command signal, switching means for establishing a motor circuit including an armature control mode and a field control mode, said switching means including means for interposing the controller between the battery and the armature and means for coupling the field to the battery in said armature control mode, said switching means further including means for interposing the controller between the battery and the field and means for coupling the armature to the battery in said field control mode, means for detecting the maximum operating level of the controller, and means responsive to said detecting means and said control signal producing means and operative upon said switching means for causing said switching means to switch from one of said modes to the other of said modes when said controller is at maximum operating level and said control signal producing means requires a further increase in said operating level, whereby said controller is safely switched between modes to control the motor in respective armature and field control modes.

4,008,424
BIDIRECTIONAL SPEED CONTROL SYSTEM

Gian Battista Bompani, Montale Rangone (Modena), Italy, assignor to Honeywell Information Systems Italia, Caluso, Italy

Filed Jan. 2, 1974, Ser. No. 430,249
Claims priority, application Italy, Dec. 28, 1972, 3377/72
Int. Cl.² H02P 5/06
U.S. Cl. 318—293 13 Claims



1. A bidirectional speed regulation system for a d.c. motor, comprising:

a transducer device for supplying pulses having a frequency related to the motor speed;

circuit means for comparing the period of said pulses with a reference period and for supplying periodic pulses whose duration is equal to the difference between said reference period and said period related to the motor speed;

a constant current generator fed by a voltage source, said generator having two independent output leads for providing a current of the same polarity on each lead;

circuit means for supplying a short control pulse in coincidence with each of said periodic pulses;

a pair of capacitors, each connected to one of said independent output leads;

a switching device controlled by said periodic pulses, for controlling the charge on said pair of capacitors, during the duration of said periodic pulses;

a pair of switching devices for short circuiting said pair of capacitors for the whole duration of said control pulses;

a conditioning logic circuit, controlled by external signals for selectively controlling said pair of switching devices and for selectively short circuiting, for the whole duration of said external signals, either one of said pair of capacitors; and

an operational amplifier for driving said motor, said amplifier including an inverting and a non-inverting input lead, an output lead connected to said motor and coupled through a feedback path to said inverting input lead, each of said input leads being connected to one of said pair of capacitors through a separate resistor so as to be coupled to ground through its resistor whenever the corresponding capacitor is short circuited.

4,008,425
MOTOR SERVO SYSTEM WITH MULTIPLIER MEANS TO DRIVE AND SERVO THE MOTOR

Baron Christian Dickey, Palo Alto, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Jan. 9, 1975, Ser. No. 539,781
Int. Cl.² H02P 5/06
U.S. Cl. 318—314 6 Claims

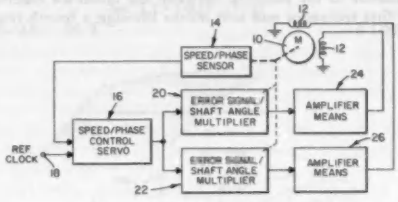
1. A servo/drive system for introducing sinusoidal drive signals to the windings of a motor having at least two windings, comprising the combination of;

tachometer means coupled to the motor for generating a tachometer signal indicative of the speed/phase characteristics and thus of the rotational error of the motor;

speed/phase control servo means coupled to the tachometer means;

means for providing a reference clock to the speed/phase control servo means, wherein the speed/phase control servo means generates the error signal by a comparison of the signal from the tachometer means and the reference clock;

error signal/shaft angle multiplier means including at least two Hall element means integral with the motor and coupled to the speed/phase control servo means and to respective windings of the motor with no switching therebetween, the multiplier means being responsive to the angular position of the rotor to inherently generate within the multiplier means sinusoidal drive signals for each



respective winding which are the product of the instantaneous rotational error of the motor times the instantaneous angular position of the motor shaft;

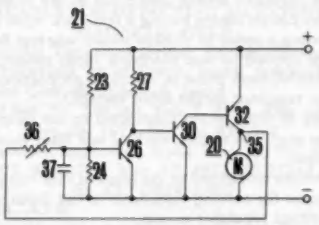
means for continuously introducing the sinusoidal drive signals to each of respective motor windings simultaneously, and including amplifier means continuously coupled between the error signal/shaft angle multiplier means and each of the motor windings; and

said sinusoidal drive signals having amplitudes proportional to the signals indicative of the rotational error, and phase proportional to the motor angular position, which drive signals provide both motor drive and servo control for the motor.

4,008,426
ELECTRONIC SPEED CONTROL SYSTEMS FOR MINIATURE DIRECT CURRENT MOTORS

Makoto Ogura, Kawasaki, Japan, assignor to Jeco Co., Ltd., Kawasaki, Japan

Filed Nov. 20, 1975, Ser. No. 633,869
Claims priority, application Japan, Nov. 28, 1974, 49-143050[U]; Jan. 14, 1975, 50-7201[U]; Feb. 18, 1975, 50-21499[U]; Feb. 20, 1975, 50-22493[U]; June 3, 1975, 50-74293[U]; Nov. 5, 1975, 50-133437
Int. Cl.² H02P 7/00
U.S. Cl. 318—331 29 Claims



1. An electronic speed control system for a miniature direct current motor comprising a first bipolar transistor of the first type, second and third bipolar transistors of the second type, a source of supply having first and second terminals, means for connecting the emitter electrode of the first transistor to the first terminal of the source, means to connect the collector electrode of the first transistor to the second terminal of said source through the brush and commutator of said motor, means to connect the base electrode of said first transistor to

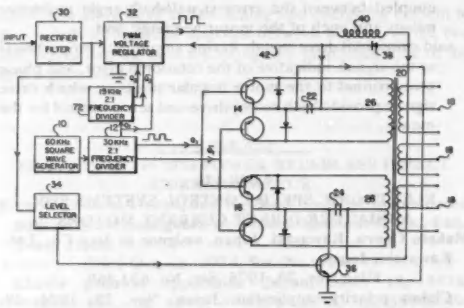
the collector electrode of said second transistor, means to connect the emitter electrode of the second transistor to the second terminal of the source, means to connect the base electrode of the second transistor to the collector electrode of the third transistor, means to connect the collector electrode of the third transistor to the first terminal of the source through a first resistor, means to connect the emitter electrode of the third transistor to the second terminal of the source, means to connect the base electrode of the third transistor to the juncture between second and third resistors which are connected in series across the first and second terminals of the source, and means to connect the base electrode of the third transistor to the juncture between the collector electrode of the first transistor and said motor through a fourth resistor.

4,008,427

VARIABLE INPUT POWER SUPPLY

Leopold J. Johnson, Escondido, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 29, 1975, Ser. No. 617,924
Int. Cl.² H02M 7/537
U.S. Cl. 321—18 **7 Claims**



1. A power supply providing a regulated output voltage over a range of input voltages, said power supply comprising:

a rectifier circuit means having input terminals for receiving AC and DC input voltages and producing a DC output voltage of constant polarity;

a voltage regulator means connected to the output of said rectifier circuit means having a feedback input means for generating a series of voltage pulses wherein for a given voltage applied to said feedback input means, the time duration of each pulse is inversely proportional to said voltage regulator means input voltage;

a plurality of filter means connected to the output of said voltage regulator means, each of said filter means having an output;

sensing means connected to the input of said voltage regulator means for sensing variations in the input voltage to said voltage regulator means;

control means connected to said sensing means and to each of said filter means for selectively coupling said series of voltage pulses to a given one of said filter means;

feedback means connected from each of said outputs of said filter means to said feedback input means of said voltage regulator means;

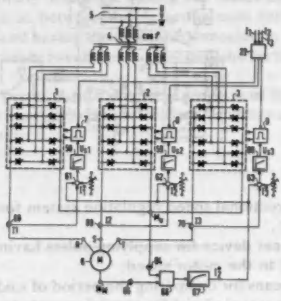
coupling means connected to each of said outputs of said filter means and to the output of said power supply for transferring power from each of said outputs of said filter means to said output of said power supply.

4,008,428

CIRCUIT ARRANGEMENT WITH A NUMBER OF FREQUENCY CONVERTERS, PARTICULARLY Y-CONNECTED DIRECT FREQUENCY CONVERTERS

Hermann Waldmann, and Manfred Weibelzahl, both of Weiher, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Jan. 7, 1976, Ser. No. 647,110
Claims priority, application Germany, Jan. 22, 1975, 2502513
Int. Cl.² H02P 13/30
U.S. Cl. 321—69 R **1 Claim**



1. A circuit arrangement for use with an m-phase symmetrical load whose conductor voltages have a predetermined periodic waveform and together form a symmetrical system, said circuit arrangement comprising:

an odd number m of direct frequency converters connected in a Y-connection and to said load without a direct connection between the neutral point of said converters and the neutral point of said load;

control units for feeding control voltages to said converters such that the output voltages of said converters have a substantially trapezoidal waveform;

current regulators each associated with one of said control units and each being responsive to the load side current generated by one of said converters, to a current reference value associated with that one converter and to a common current reference value common to all said regulators;

and means for forming said common current reference value including means for developing a difference signal corresponding to the voltage difference between the voltages at the neutral point of said converters and the neutral point of said load and a delay member responsive to said difference signal and having a time constant corresponding to the time constant of said load.

4,008,429

VOLTAGE TRANSLATOR FOR SOLID STATE WATCH

James M. Phalan, Sunnyvale, Calif., assignor to Intel Corporation, Santa Clara, Calif.

Continuation of Ser. No. 390,776, Aug. 23, 1973, abandoned. This application Mar. 31, 1975, Ser. No. 563,311
Int. Cl.² G05F 1/56
U.S. Cl. 323—17 **10 Claims**

9. A regulated timepiece power supply comprising:

a. a series circuit comprising a battery, an inductor and a switch;

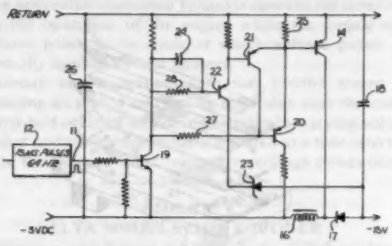
b. a capacitor coupled to said series circuit; and

c. means for maintaining the charge on said capacitor at a predetermined value, said means including a source of repetitive electrical signals coupled to said switch to cause said switch to open and close repetitively during a single charging period as long as the charge on said capacitor remains below said predetermined value, whereby

a voltage larger than the voltage of said battery will appear across said inductor each time said switch opens to provide a series of charges to said capacitor;

d. means responsive to the charge on said capacitor for generating an inhibiting signal when the charge on said capacitor exceeds a predetermined value; and

e. means responsive to said inhibiting signal for preventing said repetitive signals from closing said switch, said means including a first transistor adapted to couple said repetitive pulses to said switch and a second transistor having its emitter and collector coupled to the emitter and base respectively of said first transistor, said inhibiting signal being coupled to the base of said second transistor when the charge on said capacitor exceeds a predetermined value whereby said second transistor will present a low impedance across the emitter and base of said first transistor preventing said first transistor from coupling said repetitive signal to said switch.



4,008,430

AUTOMOTIVE TEST APPARATUS FOR COUPLING TO THE IGNITION SYSTEM OF AUTOMOTIVE INTERNAL COMBUSTION ENGINES

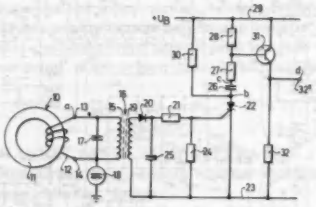
Rudolf Blum, Wendlingen, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Oct. 9, 1975, Ser. No. 620,927

Claims priority, application Germany, Dec. 19, 1974, 2460046

Int. Cl.² F02P *17/00*

U.S. Cl. 324—15 **10 Claims**



1. Test apparatus for coupling to the ignition system of internal combustion engines having

coupling means (10, 11, 12) adapted to be coupled to the ignition system of an internal combustion engine, and a pulse-shaping circuit connected to the output of the coupling means and providing an output signal having a predetermined relation to the ignition pulses regardless of additional spurious pulses being applied to the coupling means, said circuit comprising

a semiconductor switch (22, 35) providing said output signal upon change of state thereof;

and a charge storage circuit (26, 34) connected to the coupling means (10, 11, 12) and to the semiconductor switch (22, 35), said charge storage circuit having a short loading time and a re-loading or discharge time which is long with respect to said loading time to rapidly transfer a pulse applied thereto to the switch and cause rapid change of state of said switch while slowly unloading the pulse stored therein and prevent further change of state of operation of said switch during said unloading or discharge time.

4,008,431

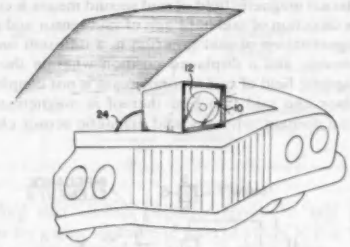
AUTOMOBILE ENGINE TUNING SCOPE

Ronald Lee Samp, Appleton, Wis., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Sept. 9, 1975, Ser. No. 611,830

Int. Cl.² F02P *17/00*

U.S. Cl. 324—16 T **3 Claims**



1. A timing stroboscope, the viewing section of which may be remotely located from an internal combustion engine to which it is attached for timing purposes, comprising

a housing enclosing a shaft rotatably mounted in said housing

a first gas discharge light bulb mounted to a member fastened to the shaft

a second gas discharge light bulb mounted to a fixed member fastened to the housing, said second light bulb mounted so as to be visible from a viewing position in which the first light bulb is also visible,

said housing formed with a window opening located to permit an observer to view both light bulbs simultaneously,

a flexible rotatable cable linking the said shaft with socket means for fastening to a shaft of an internal combustion engine, and

electric circuitry means joining both lamp bulbs in parallel to a flexible wire extending from the shaft and to a ground connection of the engine.

4,008,432

APPARATUS FOR DETECTING AN EXTERNAL MAGNETIC FIELD

Takao Sugisaki; Tatsushiro Ochiai; Kyoichi Nishikawa, and Minoru Higurashi, all of Tokyo, Japan, assignors to TDK Electronics Company, Limited, Japan

Division of Ser. No. 330,264, Feb. 7, 1973. This application Dec. 26, 1973, Ser. No. 427,508

Claims priority, application Japan, Mar. 2, 1972, 47-21787; Mar. 2, 1972, 47-21788; Mar. 17, 1972, 49-27242

Int. Cl.² G01R *33/02*

U.S. Cl. 324—43 R **4 Claims**

1. An apparatus for detecting an external magnetic field, comprising:

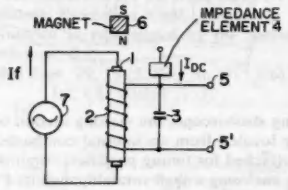
a magnetic sensor comprising an elongated member of an electrically conductive material and a thin magnetic film disposed thereabout and formed of an uniaxial magnetic anisotropic material having a magnetic hard axis disposed essentially parallel to the axis of said elongated member and a magnetic easy axis disposed about the circumference of said elongated member, and a detection coil wound about said elongated member, said magnetic sen-

sor producing parametric oscillations and having first and second oscillation states of respectively opposite phase and a non-oscillation state, in accordance with selective magnetization of said thin film in corresponding ones of first and second oscillation domains and a non-oscillation domain,

first means for producing an alternating magnetic field along said easy axis of an intensity to establish magnetization of said thin film in an oscillation domain, said first means includes further means for producing a magnetic field along said hard axis for establishing magnetization of said thin film in a desired one of said first and second oscillation states,

second means for producing an external magnetic field, and

third means for moving said second means relatively to said sensor to provide adjacent positions thereof wherein the external magnetic field of said second means is coupled to the direction of said hard axis of said sensor and produces magnetization of said thin film in a different one of said domains, and a displaced position wherein the external magnetic field of said second means is not coupled to said sensor and said thin film thereof is magnetized in said given domain, whereby said magnetic sensor changes its



state from that corresponding to magnetization of said thin film in said given domain to a state corresponding to magnetization of said thin film in said different domain,

said second means produces an external magnetic field of an intensity and polarity such that in said adjacent position thereof to said sensor, said external magnetic field switches the magnetization of said thin film to the other of said first and second oscillation domains, whereby said sensor changes from said one to said other of said first and second oscillation states of respectively opposite phases when said magnetization switches from said one to said other of said oscillation domains,

said detecting coil producing an oscillating voltage output in accordance with said sensor being in either of said first and second oscillating states and producing a zero voltage output when the sensor switches from one to the other of said first and second oscillation states of respectively opposite phase, and

means receiving the output of said detecting coil and responding to the zero voltage output of said detecting coil when the oscillation state of said sensor changes from one to the other of said first and second oscillation states of respectively opposite phase to provide an indication of the detection by said sensor of an external magnetic field.

4,008,433

CAPACITANCE DISPLACEMENT TYPE MEASURING PROBE

Stuart S. Fasser; John D. Suitto, Jr., both of Schenectady, N.Y., and William R. Marklein, San Jose, Calif., assignors to General Electric Company, Schenectady, N.Y.

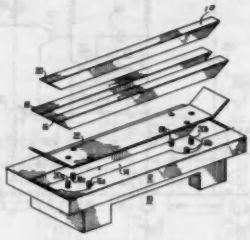
Filed Jan. 14, 1976, Ser. No. 649,083
Int. Cl.² G01R 27/26
U.S. Cl. 324—61 P **2 Claims**

1. A capacitance displacement probe for measuring the vibrations of a rotating member, wherein the probe forms one element of a capacitor and wherein the rotating member forms a second element of the capacitor and is provided with a plurality of equally spaced apart grooves having a predetermined pitch and higher surface elements intermediate the grooves, said probe comprising:

a shield electrode, including a window,

a pair of guard electrodes and

a sensing electrode having a sensing surface, said sensing surface having a length equal to an integer multiple of equal grooves and higher surface elements of the rotating member with which said probe is to be used,



first means for securing said guard electrodes within said shield electrode and each having a surface thereof substantially co-extensive with the outer plane of said window,

second means for mounting said sensing electrode between and electrically insulated from said guard electrodes, with the sensing surface of said sensing electrode being substantially co-extensive with the outer plane of said window, and

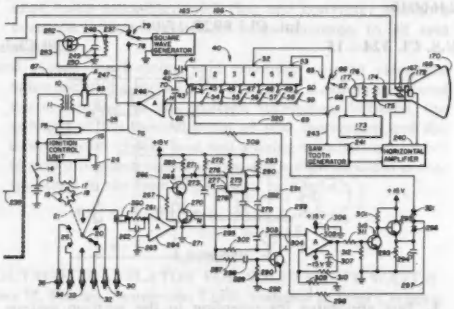
means for electrically connecting said sensing electrode surface to an electrical circuit.

4,008,434

ENGINE DIAGNOSTIC APPARATUS

Joseph H. Schaefer, Minnetonka, Minn., assignor to Applied Power Inc., Milwaukee, Wis.

Filed July 30, 1975, Ser. No. 600,228
Int. Cl.² G01R 29/00
U.S. Cl. 324—16 S **11 Claims**



1. An analyzer for multiple cylinder internal combustion engines of the type having an electrical igniter for each cylinder, electrical ignition pulse generating means, and means for sequentially applying the voltage pulses generated by said pluse generating means to said igniters, said analyzer comprising:

a connector for connection to said generating means for deriving therefrom a series of voltage pulses each substantially coincident with the application of a voltage pulse to each of said igniters,

first means connected to said connector for producing a first cyclically varying voltage of a frequency one-half of that of the frequency of occurrence of said pulses with each half cycle of the voltage beginning substantially at

the time of occurrence of one of said pulses and terminating substantially at the time of the next of said pulses,

second means connected to the output of said previously named means for producing from said first cyclically varying voltage, a second cyclically varying voltage of a frequency twice that of said first voltage so that a complete cycle of said second voltage occurs between two such voltage pulses and such that the end of the first half cycle occurs approximately midway between two such voltage pulses,

testing apparatus connected to said connector for determining the operation of the engine while the engine is at various points in its cycle at which voltage pulses are normally applied to said igniters,

and circuit means connected to said second means for initiating a cycle of said testing apparatus near the end of a first half cycle of said second cyclically varying voltage so that said testing operation is initiated at a time intermediate the times at which successive voltage pulses occur.

4,008,435

DELTA MODULATION ENCODER

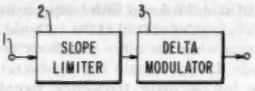
Toshio Oshima, and Tatsuo Ishiguro, both of Tokyo, Japan, assignors to Nippon Electric Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 365,327, May 30, 1973, abandoned. This application Feb. 25, 1975, Ser. No. 552,894

Claims priority, application Japan, May 30, 1972, 47-54104

Int. Cl.² G01R *33/12*

U.S. Cl. 325—38 B **2 Claims**



1. In combination, a slope limiting means for limiting the slope of input video signals to a predetermined slope and a delta modulator for performing delta modulation of the slope-limited video signals delivered from said slope limiting means; wherein said slope limiting means includes a subtraction circuit for providing a signal representative of the difference between said input video signals and a subtracting input, an amplitude-limited amplifier, having saturation levels, for amplifying the output of said subtraction circuit, an integrating circuit for time-integrating the output of said amplifier and feeding it back to said subtracting circuit as said subtracting input said slope-limited video signals being provided at the output of said integrating circuit and having a slope less than or equal to said predetermined slope which is lower than 0.9 times the maximum slope which said delta modulator can follow.

4,008,436

CHANNEL SELECTING APPARATUS

Yoshitoshi Fujita, Yokohama, Japan, assignor to Victor Company of Japan, Limited, Japan

Filed May 23, 1975, Ser. No. 580,359

Claims priority, application Japan, May 27, 1974, 49-59697

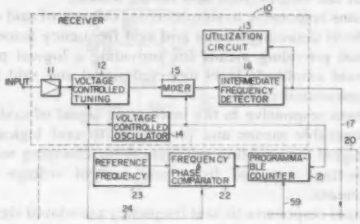
Int. Cl.² H04B *1/36*

U.S. Cl. 325—335 **3 Claims**

1. In a receiver having a voltage-controlled local oscillator means for generating different frequency oscillations to tune the receiver to different tunable frequencies, mixer means responsive to received signals and said oscillations to produce an output signal, and utilization means coupled to said mixer means for utilizing in said receiver said output signal, channel selecting apparatus comprising:

means for generating a variable binary number and including means for generating first and second trains of pulses at different repetition frequencies, an up-down binary counter having count-up and count-down modes of operation for counting said trains of pulses to produce a binary number;

manual means including a grounded metal support, first, second and third metal contact plates insulatively supported on said metal support and arranged side by side in close proximity to each other, first, second and third amplifier means respectively coupled to said first, second and third contact plates, means coupling said first amplifier means to said binary counter to operate the same in said count-up mode, means coupling said third amplifier means to said binary counter to operate the same in said count-down mode, and gate circuit means for gating said first train of pulses to said counter under the control of the signal from said first and third amplifier means, means



coupling said second amplifier means to said gating means for gating said second train of pulses to said binary counter while inhibiting said first train of pulses;

a phase-locked loop including said voltage-controlled means, means coupled to said oscillator for demultiplying the oscillation frequency thereof by a factor of said variable binary number, and means for comparing said demultiplied frequency with a reference frequency to produce a control voltage, said control voltage being supplied to said voltage-controlled means; and

means responsive to said output signal to cause said up-down binary counter to stop counting when said system is tuned to a selected channel.

4,008,437

AUTOMATIC TUNING APPARATUS

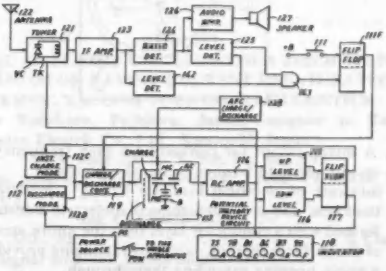
Yoshiaki Sakauchi, Tenri; Kazufumi Ushijima, Hirakati; Hajime Suzuki, Higashiosaka, and Shigeru Wakamoto, Daito, all of Japan, assignors to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed Aug. 4, 1975, Ser. No. 601,283

Claims priority, application Japan, Dec. 17, 1974, 49-147047

Int. Cl.² H04B *1/34*

U.S. Cl. 325—422 **7 Claims**



1. An automatic tuning apparatus comprising:

tuning means comprising a voltage controlled variable reactance device.

means for supplying a control voltage to said voltage controlled variable reactance device, said control voltage

determining a reactance value of said voltage controlled variable reactance device and thus determining a tuning frequency of said tuning means,

means for changing said control voltage supplied from said control voltage supplying means to said voltage controlled variable reactance device for causing a change in reactance of said voltage controlled reactance device and thus a change in a tuning frequency of said tuning means,

manually operable means for instructing said change in a tuning frequency of said tuning means,

means for level detecting the amplitude of the output from said tuning means,

means for providing a signal associated with the frequency of the output from said tuning means,

means responsive to simultaneous outputs of said amplitude level detecting means and said frequency associated signal providing means for providing a logical product of said amplitude level detected signal and said frequency associated signal,

means responsive to the instructing signal of said manually operable means and responsive to said logical product signal for enabling said means for changing said control voltage supplied from said control voltage supplying means,

means responsive to said frequency associated signal of said frequency associated signal providing means for changing said control voltage supplied from said control voltage supplying means for compensating deviation of the tuning frequency,

means responsive to absence of said amplitude level detected signal of said amplitude level detecting means for disabling said frequency compensating means, and

means responsive to turning on of a power supply for providing for a predetermined period of time a pseudo amplitude level detected signal for forcibly enabling said frequency compensating means for said predetermined period of time.

4,008,438

RAT-RACE MIXER CIRCUIT

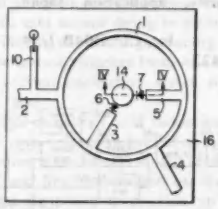
Keiro Shinkawa; Chiuichi Sodeyama, and Hirozi Shoyama, all of Yokohama, Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 28, 1975, Ser. No. 626,278

Claims priority, application Japan, Oct. 28, 1974, 49-123351

Int. Cl.² H04B 1/26

U.S. Cl. 325—446 **3 Claims**



1. A mixer circuit for converting a high frequency signal into an intermediate frequency signal comprising:

a substrate of electrical insulator having a predetermined thickness and a predetermined dielectric constant and formed with a conductor layer over the entire area of one of the surfaces thereof, said substrate being provided with a single opening extending therethrough;

a rat-race circuit constituted by disposing microstrip lines in a desired circuit pattern on the other surface of said substrate to provide a first transmission line forming a circular closed loop having the center registering substantially with said opening and having an overall circumferential length corresponding to three half the wavelength of the high frequency signal to be converted into the intermediate frequency signal, a second transmission line connected at one end thereof to said first transmission line and having an impedance which is 1/ 2 times the impedance of said first transmission line, and a third, a fourth and a fifth transmission line connected at one end thereof to said first transmission line in such a relationship that they are successively spaced apart from the connection point of said second transmission line in the above order along said first transmission line by an arcuate distance corresponding to one quarter the wavelength of the high frequency signal, said third, fourth and fifth transmission lines having an impedance equal to that of said second transmission line, the other end of said second and fourth transmission lines extending toward the exterior of said circular closed loop while the other end of said third and fifth transmission lines extending radially inward toward the center of said circular closed loop formed by said first transmission line;

means for supplying the high frequency signal to be subject to frequency conversion to one of said second and fourth transmission lines in said rat-race circuit and supplying a local oscillation signal to the other said transmission line in said rat-race circuit;

conductive means including a bar conductor inserted into said opening bored in said substrate at substantially the center of said circular closed loop formed by said first transmission line on said substrate; and

a pair of diodes connected respectively between the portion of said bar conductor exposed from said opening and the inner end of said third and fifth transmission lines, one of said diodes being connected at the cathode thereof to said bar conductor while the other said diode being connected at the anode thereof to said bar conductor;

whereby the intermediate frequency signal obtained by subjecting said high frequency signal to frequency conversion can be derived from said bar conductor at said one surface side of said substrate.

4,008,439

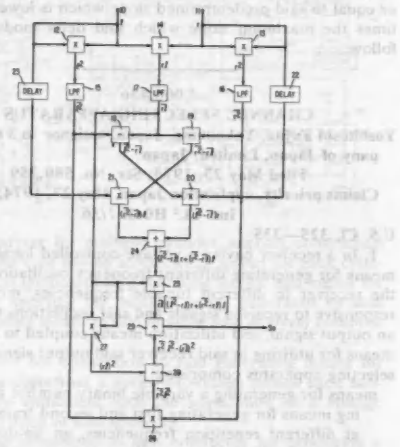
PROCESSING OF TWO NOISE CONTAMINATED, SUBSTANTIALLY IDENTICAL SIGNALS TO IMPROVE SIGNAL-TO-NOISE RATIO

Manfred Robert Schroeder, Gottingen, Germany, assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 20, 1976, Ser. No. 659,700

Int. Cl.² H03B 1/04

U.S. Cl. 328—163 **6 Claims**



1. A combination of processing two substantially identical signals contaminated by uncorrelated noise to produce an

output having a greater signal-to-noise ratio than either of said signals contaminated by noise, said combination comprising:

first means for receiving said signals contaminated by noise to produce the quantities $\bar{l}^2$, $\bar{r}^2$ and $\overline{rl}$, where the symbols l and r represent the instantaneous amplitudes of said two signals contaminated by noise, respectively, and the bars over said symbols indicate moving averages of the quantities represented by said symbols, and

second means connected to said first means for combining said instantaneous amplitudes represented by said symbols r and l and said quantities $\bar{l}^2$, $\bar{r}^2$ and $\overline{rl}$ in the following manner

$$\frac{\bar{r}[(\bar{l}^2-\overline{rl})r+(\bar{r}^2-\overline{rl})l]}{\bar{r}^2\bar{l}^2-(\overline{rl})^2}$$

4,008,440

AMPLITUDE-LIMITER

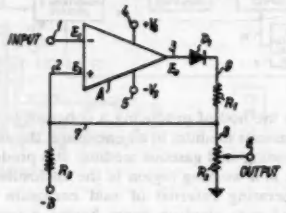
Shigeyuki Mizukoshi, Tokyo, Japan, assignor to Iwasaki Tsushinki Kabushiki Kaisha, Japan

Filed May 22, 1975, Ser. No. 579,936

Claims priority, application Japan, May 25, 1974, 49-58955

Int. Cl.² H03K *5/08;* **H03B** *3/02*

U.S. Cl. 328—171 **3 Claims**



1. A limiter comprising:

A differential amplifier having at least a first input terminal receptive of an input AC signal, a second input terminal, an output terminal for providing an output signal proportional to a difference between voltages respectively applied to said first input terminal and said second input terminal, a positive power source terminal receptive in use of a positive source voltage having a level which determines the positive level limit of the differential amplifier output signal, and a negative power source terminal;

a feedback circuit connected between said output terminal of said differential amplifier and said second input terminal so that the output voltage derived from the output terminal of said differential amplifier is positively fed back to said second input terminal;

an output circuit connected to said feedback circuit for deriving therefrom an amplitude-limited output signal;

said feedback circuit including a rectifier element connected between said output terminal and said output circuit and having a polarity effective to pass positive portions of the differential amplifier output signal to said output circuit; and

a bias voltage set circuit connected to said second input terminal for applying a negative bias voltage to said second input terminal and to limit conduction of said diode when the differential amplifier output signal is less than a certain value determined by the negative bias voltage, thereby to limit the negative level of the output signal.

4,008,441

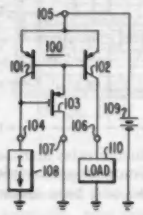
CURRENT AMPLIFIER

Otto Heinrich Schade, Jr., North Caldwell, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Aug. 16, 1974, Ser. No. 498,108

Int. Cl.² H03F *3/16*

U.S. Cl. 330—35 **38 Claims**



1. A current mirror amplifier comprising:

an input terminal, an output terminal and a common terminal;

first and second transistors, being bipolar junction transistors having respective emitter electrodes and respective base electrodes and respective collector electrodes;

first current conductive means connecting said common terminal to said first transistor emitter electrode;

second current conductive means connecting said common terminal to said second transistor emitter electrode;

third current conductive means connecting said first transistor collector electrode to said input terminal;

fourth current conductive means connecting said second transistor collector electrode to said output terminal;

a third transistor, being a field-effect transistor having a gate electrode connected to said input terminal, and having a source electrode and a drain electrode;

means for applying a potential between said common terminal and the drain electrode of said third transistor to condition said third transistor for source-follower operation;

first direct coupling means for direct coupling said third transistor source electrode to said first transistor base electrode; and

second direct coupling means for direct coupling said third transistor source electrode to said second transistor base electrode, said first and said second direct coupling means each having substantially similar potential translating characteristics to each other.

4,008,442

SIGNAL AMPLIFIER CIRCUIT WITH A FIELD EFFECT TRANSISTOR HAVING CURRENT UNSATURATED TRIODE VACUUM TUBE CHARACTERISTICS

Shigeru Todokoro, Fujisawa, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed June 10, 1975, Ser. No. 585,595

Claims priority, application Japan, June 19, 1974, 49-70675[U]

Int. Cl.² H03F *3/16, 1/30*

U.S. Cl. 330—35 **2 Claims**

1. A signal amplifier comprising:

first and second different potential points;

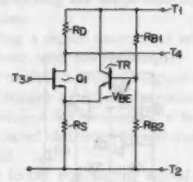
a field effect transistor having gate, drain and source electrodes and displaying current unsaturated triode vacuum tube characteristics;

a bipolar transistor having collector, emitter and base electrodes, the collector and emitter electrodes of said tran-

sistor being coupled to said first potential point and said source electrode of said field effect transistor, respectively;

first resistive impedance means coupled between said first potential point and said drain electrode of said field effect transistor;

second resistive impedance means coupled between said second potential point and said source electrode of said field effect transistor;



third resistive impedance means coupled between said first potential point and said base electrode of said bipolar transistor; and

fourth resistive impedance means coupled between said second potential point and said base electrode of said bipolar transistor,

said third resistive impedance means having a resistive value which substantially equals that of said fourth resistive impedance means multiplied by the voltage amplification factor of said field effect transistor.

4,008,443

QUATERNARY FREQUENCY SYNTHESIZER

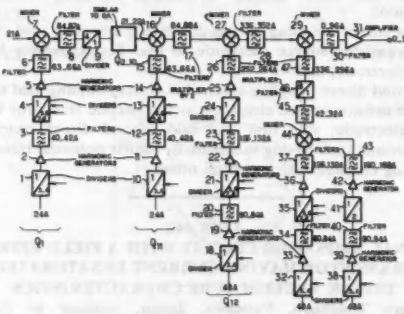
Joël Rémy, Paris, France, assignor to Adret Electronic, Trappes, France

Continuation of Ser. No. 483,910, June 27, 1974, abandoned. This application Nov. 14, 1975, Ser. No. 632,002

Claims priority, application France, Mar. 15, 1974, 74.08948

Int. Cl.² H03B 21/02

U.S. Cl. 331—38 **14 Claims**



1. A frequency synthesizer generating a resultant frequency of precise value expressed in a number of base 4, comprising:

n **selective mixing means respectively numbered 1 to *n*, where *n* is an integer greater than 1, having respective first and second inputs and respective outputs, the first input of the first mixer being fed with a fixed reference frequency signal, the first input of the i^{th} mixer (with $i = 2, 3 \ldots n$) being coupled to the output of the $(i-1)^{th}$ mixer, said synthesizer further comprising:**

a plurality of signal-translating channels numbered 1 to *n* for selecting in each channel a digit to appear in said resultant frequency,

each channel comprising means for producing from a single given frequency an individual frequency having an accurately controlled value equal to one among only four frequency values in arithmetical progression which is fed to the said respective second inputs, and

each said channel comprising at least one variable factor dividing means coupled in series with fixed passband filtering means, said single frequency being applied to said dividing means.

4,008,444

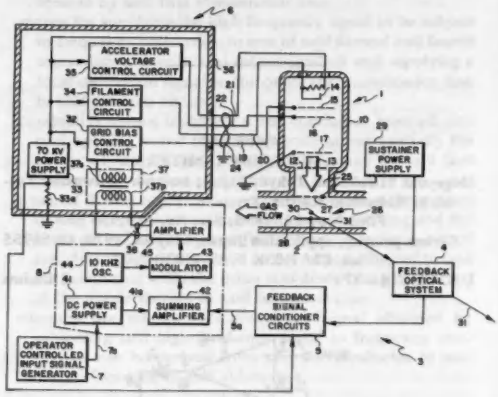
FEEDBACK CONTROL OF A LASER OUTPUT

Jacob L. Zar, North Andover, and Robert E. Serris, Burlington, both of Mass., assignors to Avco Everett Research Laboratory, Inc., Everett, Mass.

Filed Jan. 19, 1976, Ser. No. 650,309

Int. Cl.² H01S 3/13

U.S. Cl. 331—94.5 S **21 Claims**



1. In a method of producing a coherent beam of radiation from a gaseous medium in an enclosure, the steps comprising:

a. providing said gaseous medium at a predetermined pressure in a working region in the enclosure;

b. generating external of said enclosure a substantially broad area electron beam having a cross section area conforming substantially to said working region;

c. introducing said electron beam to said enclosure to produce in the working region a substantially spacially uniform predetermined density of secondary electrons in the medium;

d. providing an electric field in the working region which increases the average energy of said secondary electrons therein without substantially increasing the electron density therein;

e. the energy of said secondary electrons being sufficient to stimulate the emission of said coherent beam of radiation;

f. causing said beam of coherent beam of radiation to eminate from the enclosure;

g. intercepting the eminating beam of coherent radiation;

h. converting said intercepted radiation into an electrical feedback signal representative of the power thereof; and

i. employing said electrical feedback signal to control the electron beam, thereby providing a feedback system for controlling the coherent beam of radiation.

4,008,445

ULTRA-VIOLET GAS LASER

Karl Gerhard Hernqvist, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Sept. 4, 1975, Ser. No. 610,182

Int. Cl.² H01S 3/03

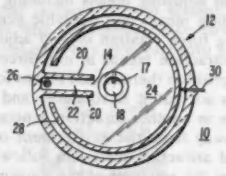
U.S. Cl. 331—94.5 D **9 Claims**

1. A gas laser comprising:

a tube having two regions opening into one another;

a laser gas within the tube;

means for establishing a space charge double sheath between the regions to provide a high electron temperature in one region and a low electron temperature in the other region; and



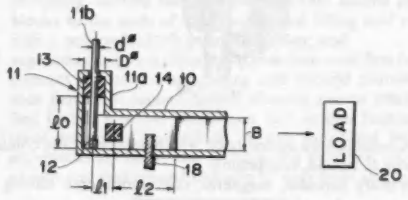
a mirror located at each end of the region of low electron temperature.

4,008,446

MICROWAVE OSCILLATION DEVICE WHOSE OSCILLATION FREQUENCY IS CONTROLLED AT THE RESONANCE FREQUENCY OF A DIELECTRIC RESONATOR

Kenji Hirai, Yokohama, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed July 30, 1975, Ser. No. 600,527
Claims priority, application Japan, Aug. 1, 1974, 49-87513
Int. Cl.² H03B 9/12
U.S. Cl. 331—96 **14 Claims**



1. A microwave oscillation device comprising a cut-off waveguide having a cut-off characteristic with respect to a frequency used, a coaxial line section provided at one end of said cut-off waveguide, a resistor provided at one end of said coaxial line portion, an oscillation element provided at the other end of said coaxial line section, a dielectric resonance element resonating at said frequency used, disposed within said cut-off waveguide so as to be electromagnetically coupled to said oscillation element in terms of lumped constant, and an output waveguide connected to the other end of said cut-off waveguide so as to be electromagnetically coupled to said dielectric resonance element in terms of distributed constant.

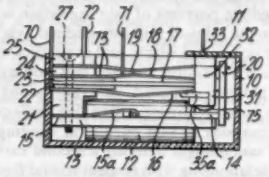
9. A microwave oscillation device comprising a waveguide short-circuited at one end and connected at the other end to a load, a metal-shielding plate for forming cut-off regions each having a cut-off characteristic with respect to a frequency used, disposed spaced by a prescribed distance from an E plane of said waveguide and substantially in parallel with said E plane, and in contact with H planes of said waveguide and substantially perpendicularly to said H plane and connected at one end to a short-circuiting end of said waveguide, a coaxial line section provided in one of said cut-off regions closely to said short-circuiting end of said waveguide, a resistor provided at one end of said coaxial line section, an oscillation element provided at the other end of said coaxial line section, and a dielectric resonance element provided within said one cut-off region so as to be electromagnetically coupled to said oscillation element in terms of lumped constant and to said load in terms of distributed constant.

4,008,447

MINIATURE ELECTRICAL RELAY

Joseph Anderson; Joseph Louis Lagasse; Satinder Singh, all of Montreal, and Victor Milalauskas, St. Laurent, all of Canada, assignors to Northern Electric Company Limited, Montreal, Canada

Filed Nov. 14, 1975, Ser. No. 631,939
Int. Cl.² H01H 67/02
U.S. Cl. 335—128 **6 Claims**



1. A miniature electrical relay including a hollow housing, a base plate closing the housing and a relay mechanism in said housing, said relay mechanism comprising:

a core and coil assembly, said core including a bottom portion and a central leg extending from said bottom portion, said coil positioned on said central leg, and further including two side legs, one on each side of said central leg extending parallel thereto and spaced therefrom;

an armature adjacent said core and actuated thereby;

means pivotally mounting said armature for movement toward and away from said core;

a series of contact springs positioned in stacked sequence on the side of said armature remote from said core;

an insulating member positioned between each adjacent pair of contact springs;

an operating card mounted at one end on said armature and including formations engaging with said series of contact springs for actuation thereof on movement of said armature towards and away from said core;

said armature of U shape and including two parallel spaced apart legs extending towards said bottom part of said core;

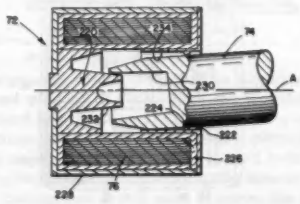
said means pivotally mounting said armature comprising a hinge spring attached to a bottom part of said core, said spring of U shape and including two parallel spaced apart legs extending towards an upper part of said core, said legs of said hinge spring and of said armature in overlapping relationships at their ends, and interengaging formations on said ends releasably attaching said armature to said hinge spring.

4,008,448

SOLENOID WITH SELECTIVELY ARRESTIBLE PLUNGER MOVEMENT

Juerg Muggli, Woburn, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Oct. 3, 1975, Ser. No. 619,361
Int. Cl.² H01F 7/13
U.S. Cl. 335—258 **11 Claims**



1. Solenoid apparatus comprising:

an elongated excitation winding defining a longitudinal axis around which said excitation winding is disposed, along which said excitation winding extends, and with respect to which said excitation winding is radially spaced;

means for cooperating with said excitation winding, when said excitation winding is energized, for establishing a substantially low reluctance flux path for the electromagnetic field of said excitation winding, said flux path establishing means including a stationary armature positioned adjacent one end of said excitation winding and extending intermediate portions of said excitation winding disposed on opposite sides of said longitudinal axis to define a first surface positioned within said excitation winding intermediate said excitation winding and said axis and an elongated plunger disposed generally along said axis and having an end portion extending between radially disposed portions of said excitation winding, said end portion of said plunger defining a second surface disposed in facing relationship with respect to said first surface of said armature, at least one of said surfaces constituting a guide surface extending generally lengthwise of said axis and against which said other surface is adapted to be slidably seated;

means, spaced from said first surface lengthwise of said axis and extending radially inwardly from said excitation winding into contact with the longitudinal extending peripheral surface of said plunger, for establishing a fulcrum upon which said plunger, can pivot to selectively effect engagement between said first and second surfaces; and

means for urging said plunger outwardly of said excitation winding in the direction away from its said one end, when said excitation winding is unenergized,

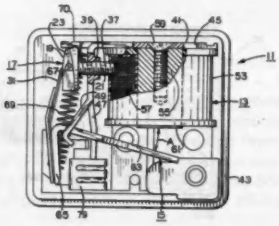
said surfaces further being configured and arranged such that, when said excitation winding is energized at a first predetermined level, contact is effected between said guide surfaces under a force sufficient to establish frictional forces therebetween precluding further displacement of said plunger in either direction along said axis and, when said excitation winding is subsequently energized at a second predetermined level greater than said first predetermined level, the frictional forces thereby established between said first and second surfaces and the force exerted on said plunger by said plunger urging means are insufficient to preclude further displacement of said plunger inwardly of said excitation winding towards its said one end under the influence of said electromagnetic field.

4,008,449

ELECTRICAL CONTROL DEVICE AND METHODS OF ADJUSTING AND OPERATING

George E. Morris, Sterling, and Ronald W. Poling, Morrison, both of Ill., assignors to General Electric Company, Fort Wayne, Ind.

Filed May 27, 1975, Ser. No. 581,272
Int. Cl.² H01H *69/01*
U.S. Cl. 335—273 **26 Claims**



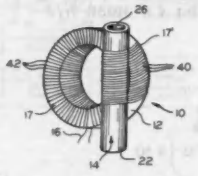
1. An electrical control device comprising an electromagnet, means adapted for attraction from a generally at-rest position through an air gap into magnetic holding engagement with said electromagnet upon its energization, means rotatable in response to an applied adjusting force thereon for adjusting said attraction means toward a selected at-rest position thereof, said adjusting means including means engaged with said attraction means and operable generally upon the applied adjusting force rotation of said adjusting means for camming said attraction means in one direction toward the selected at-rest position thereof, and means for mounting said adjusting means so that it is rotatable and also conjointly linearly movable in another direction generally opposite the one direction away from the engagement of said camming means with said attraction means in following engagement therewith so that the resultant of the movements in the one and another directions of said attraction means is a function of the conjoint rotatable and linear movements of said adjusting means in response to the applied adjusting force thereon to adjustably alter the air gap.

4,008,450

TUNABLE COIL ASSEMBLY

Evangelos Argoudelis, Northbrook, Ill., assignor to Filtech Corporation, Elk Grove, Ill.

Filed May 30, 1975, Ser. No. 582,273
Int. Cl.² H01F *21/06*
U.S. Cl. 336—132 **18 Claims**



1. A tunable core assembly on which an electrically conductive wire is wound, comprising:

a primary toroidal, magnetic, continuous core having an opening therethrough;

an adjustable magnetic core means including a hollow holder attached to the outside of the primary core and a tuning slug movable inside said holder, said wire including at least one turn extending through said opening and being wound around and in contact with said primary core and the outside of the holder, said adjustable core means not extending into or through said opening.

4,008,451

HIGH-VOLTAGE FUSE AND PROCESS OF MANUFACTURING THE SAME

Erwin Salzer, Waban, Mass., assignor to The Chase-Shawmut Company, Newburyport, Mass.

Filed Sept. 22, 1975, Ser. No. 615,810
Int. Cl.² H01H *85/08, 85/12*
U.S. Cl. 337—161 **8 Claims**

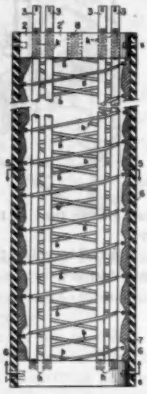
1. A process for manufacturing electric fuses including the steps of

a. forming a first squirrel-cage-like structure out of a first pair of spaced, substantially semi-cylindrical co-axially arranged metal blocks and a first plurality of metal rods arranged parallel to the axes of said first pair of blocks, of winding a first fusible element means substantially helically around said first plurality of rods and conductively connecting the ends of said first fusible element means to said first pair of blocks;

b. forming a second squirrel-cage-like structure of a second pair of spaced substantially semi-cylindrical co-axially arranged metal blocks and a second plurality of metal

rods arranged parallel to the axes of said second pair of blocks, winding a second fusible element means substantially helically around said second plurality of rods and conductively connecting the ends of said second fusbile element means to said second pair of blocks;

c. juxtaposing the planar surfaces of said first pair of blocks and the planar surfaces of said second pair of blocks, inserting said first squirrel-cage-like structure and said second squirrel-cage-like structure into a common tubu-



lar casing, affixing said first pair and said second pair of blocks to the ends of said casing, and filling said casing with a pulverulent arc-quenching filler; and

d. separating said first plurality of rods from said first fusible element means and separating said second plurality of rods from said second fusible element means after said first fusible element means and said second fusible element means are embedded in and supported by said arc-quenching filler, and withdrawing said first plurality of rods and said second plurality of rods from said casing.

4,008,452

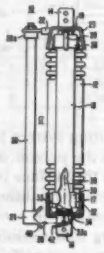
CURRENT LIMITING FUSE DEVICE FOR RELATIVELY HIGH CURRENT

Frank L. Cameron, North Huntingdon, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 1, 1975, Ser. No. 601,580

Int. Cl.² H01H *85/12, 85/04*

U.S. Cl. 337—284 **10 Claims**



1. Fuse apparatus which is capable of conducting a relatively high value of rated current and of providing significant current limitation during a fusing operation, comprising:

a. support means;

b. first fuse means disposed upon said support means, comprising:

1. a first pair of spaced ferrule means which are interconnectable in circuit relationship with a source of electrical current;

2. non-current limiting fuse element means one end of which is connected in circuit relationship with one ferrule of said pair of spaced ferrule means;

3. separator means one end of which is connected in circuit relationship with the other ferrule of said pair of spaced ferrule means and the other end of which is connected in circuit relationship with the other end of said first non-current limiting fuse element means for providing a first insulating gap between said spaced ferrules when said non-current limiting fuse element fuses said first gap enlarging in size during a predetermined time;

4. gas evolving means disposed relative to said first fuse element means to evolve electrically conducting gas when said non-current limiting fuse element means fuses;

5. director means for directing said evolved gas;

c. second fuse means disposed on said support means, comprising:

1. a second pair of spaced ferrule means; and

2. current limiting fuse element means one end of which is connected in circuit relationship with one ferrule of said second pair of spaced ferrules and the other end of which is connected in circuit relationship with the other ferrule of said second pair of spaced ferrules, one ferrule of said first pair of spaced ferrule means and one ferrule of said second pair of spaced ferrule means being connected in circuit relationship, the other ferrule of said first pair of spaced ferrule means and the other ferrule of said second pair of spaced ferrule means being spaced from one another to provide a second insulating gap of predetermined size, said director means being oriented to direct said evolved gas into said second gap to provide a current conducting path across said second gap, fusing current in said non-current limiting fuse element means thusly being commutated to said second fuse element means to be limited thereby, said current being prevented from returning to said non-current limiting fuse element means thereafter by an increased enlargement of said first insulating gap.

4,008,453

THERMAL CHANGE-OVER SWITCH

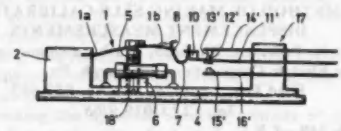
Dieter Hacker, Leingarten 1; Rolf Jäger, Heilbronn-Horkheim, and Dieter Lettau, Heilbronn, all of Germany, assignors to Grossag Gesellschaft Mit Beschrankter Haftung, Germany, a part interest

Filed Mar. 25, 1975, Ser. No. 561,893

Claims priority, application Germany, Mar. 27, 1974, 2414884

Int. Cl.² H01H *37/54, 37/60*

U.S. Cl. 337—345 **26 Claims**



1. A change-over switch comprising a plurality of switch arms disposed parallel to each other and movable between first and second limit positions, a transverse member non-torsionally interconnecting said switch arms, a plurality of fixed contacts for engagement respectively by said switch arms in each said position, a thermally deformable bimetal actuating element for moving said switch arms to one or the other limit position in response to changes in temperature, and a prestressed resilient element coupling said bimetal element with

said transverse member, said resilient element having two stable positions corresponding respectively to the said limit positions and an intervening dead center position, and is arranged to be moved between the said stable positions by deformation of the bimetal element, whereby on such deformation the switch arms will be moved from one limit position to the other with a snap-action.

4,008,454

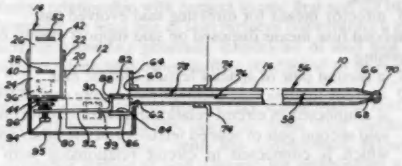
DIFFERENTIAL EXPANSION ROD AND TUBE THERMOSTAT

Teamus Bowling, Fern Creek, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Nov. 4, 1975, Ser. No. 628,814

Int. Cl.² H01H *37/46*

U.S. Cl. 337—386 **7 Claims**



1. A thermally-responsive switch assembly comprising:

a base;

a housing attached to said base;

switch means attached to said housing;

a differential expansion thermostat having an outer tube secured to said base and an inner rod secured to the tube adjacent the free end thereof, the rod being formed of a material having a much lower coefficient of thermal expansion than that of the material of the outer tube, the thermostat being adapted to project into an oven cooking cavity to sense the oven interior temperature, a mounting means for supporting the thermostat through a wall forming the oven cooking cavity so as to leave a predetermined length of the tube on the outside of the oven to be free of exposure to the oven ambient temperature;

the inner rod of the thermostat being mostly exposed to the oven ambient temperature;

an extension strap joined to the end of the inner rod and being of a material with a high coefficient of thermal expansion that is substantially the same as that of the outer tube;

an amplifier lever joined to the extension strap; and

a hinge means provided between the amplifier lever and the base so that movement of the combined inner rod and extension strap causes movement of the free end of the amplifier lever for operating the said switch means.

4,008,455

METHOD OF MAKING SELF-CALIBRATED DISPLACEMENT MEASUREMENTS

Herbert N. Pedersen, Richland, Wash., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 24, 1975, Ser. No. 552,582

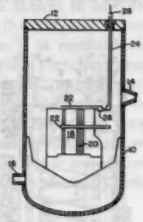
Int. Cl.² G01S *9/68*

U.S. Cl. 340—1 R **3 Claims**

1. An on-line method of measuring the displacement of a core of a nuclear reactor designed to be substantially stationarily supported within the reactor during reactor operation and cooled by an acoustically conductive medium wherein an acoustically reflective surface formed with a step discontinuity of known height between parallel legs of the step, is fixedly coupled to the core and submerged within the coolant, comprising the steps of:

directing at least one acoustic pulse to impinge upon the step discontinuity on the reflective surface in a manner that will provide first and second discrete reflected acoustic signals respectively reflecting off of the respective legs of the step;

detecting the first and second discrete reflected signals at a corresponding first and second distance from the reflecting surface where the first and second distances differ in length by the known height;



determining a measure of the time of travel of the first and second signals; and

cross-correlating the time of travel of the respective signals with the known height to provide a calibrated measure of displacement.

4,008,456

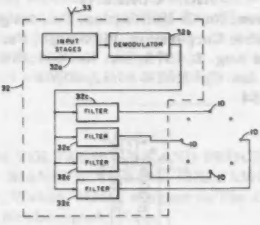
TACTILE TARGET ALERTING SYSTEM

Wade H. Ewart, Guntersville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 30, 1975, Ser. No. 591,801

Int. Cl.² G01V *1/00*; H04B *13/00*; H04R *15/00*

U.S. Cl. 340—6 R **1 Claim**

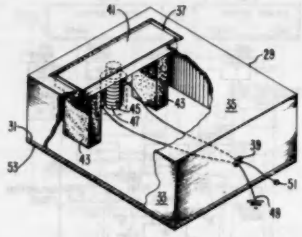


1. A tactile target alerting system for a person; including a close-fitting garment for the person; a circle pattern of sensation producing means in the surface of said garment; a plurality of filter means each passing a different frequency individually connected to said pattern of sensation producing means for selectively energizing said sensation producing means; a plurality of oscillator means equal in number to said filter means; switching means connected to said oscillator means so as to selectively energize desired ones of said oscillator means; connecting means connecting said oscillators to said filter means; control means connected to each oscillator so as to variably control the power output of said oscillator; and power means connected to said switching means to provide power for said oscillators.

4,008,457
PRESSURE TRANSDUCING APPARATUS FOR USE IN A SIGNATURE IDENTIFICATION SYSTEM

Arthur J. Radcliffe, Jr., Ann Arbor, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 525,863, Nov. 21, 1974, abandoned. This application Dec. 29, 1975, Ser. No. 645,271
Int. Cl.² G06K 9/00
U.S. Cl. 340—146.3 SY **10 Claims**



1. A pressure transducing apparatus for converting the pressure variations produced on a writing surface when an individual signs his signature to electrical waveforms representative thereof comprising:

writing surface means for receiving the pressure exerted when an individual signs his signature;

resilient means for supporting said writing surface means and being responsive to the pressure applied thereto for yielding so as to allow said writing surface means to be vertically displaced in proportion to the variations in pressure exerted on said writing surface means when an individual signs his signature;

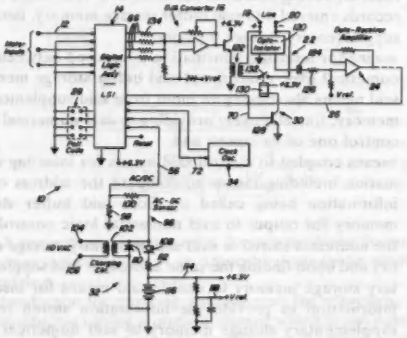
means for rigidly attaching a core of magnetic material to said writing surface means for vertical displacement therewith; and

sensing means co-axially positioned about said core of magnetic material for generating an electrical waveform in response to the vertical displacement of said core of magnetic material, said electrical waveform being representative of the pressure variations produced on said writing surface means when an individual signs his signature thereon.

4,008,458
REMOTE AUTOMATIC READING SYSTEM

Gerald J. Wensley, Omaha, Nebr., assignor to Darco Telemetering Systems, Omaha, Nebr.

Filed Sept. 5, 1975, Ser. No. 610,895
Int. Cl.² H04Q 9/00
U.S. Cl. 340—151 **13 Claims**

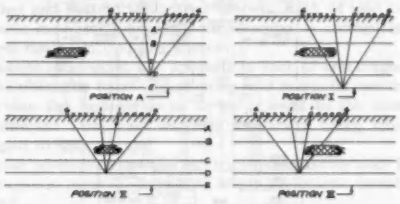


1. In combination with a sensor at a data reading station detecting a sequence of events to produce corresponding switch closures, and a telephone communication system having message lines, through which polling signals are transmitted to said data reading station for interrogation thereof and data signals from the data reading station are transmitted to a data collecting station, an automatic reading unit comprising digital logic means connected to the sensor for storing digital input data in response to said switch closures interrogation input means coupling the message lines to the digital logic means for transforming said stored digital input data into a frequency shifted, step simulated sinusoidal waveform in response to a coded analog polling signal, digital-to-analog converter means coupling said digital logic means to the message lines for converting said transformed digital input data into an analog data signal transmitted by the message lines to the data collecting station, a source of AC power connected to the automatic reading unit for operation thereof independently of the telephone communication system and an auxiliary source of DC power for operating the automatic reading unit in response to loss of power from the AC power source, said digital input data having a format including data bits corresponding to said switch closures and a power sensing bit representing the state of the AC power source.

4,008,459
METHOD OF SEISMIC SURVEYING FOR STRATIGRAPHIC TRAPS

Hugh O. Walker, Jr., Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Filed July 18, 1975, Ser. No. 597,067
Int. Cl.² G01V 1/20, 1/28
U.S. Cl. 340—15.5 CP **7 Claims**



1. A method of seismic prospecting for stratigraphic traps of expected horizontal extent in subterranean earth formations comprising the steps of:

a. arranging a seismic source detector spread comprising a plurality of seismic energy sources and a plurality of seismic detectors having a horizontal extent approximately at least twice the expected horizontal extent of any subsurface feature being prospected for at a first source detector spread location along a line traversing a subterranean region to be prospected;

b. imparting from seismic energy sources at said first spread location, acoustic energy which travels generally downwardly and outwardly from said source into the subterranean region to be prospected;

c. recording as a function of time signals representative of the amplitudes of reflected seismic energy at said detector locations in the spread;

d. determining the apparent stacking velocity of seismic energy from a plurality of selected subsurface reflectors at each such impartation of seismic energy by said seismic energy sources;

e. moving said source detector spread location a predetermined horizontal distance approximately 1/10 the expected horizontal extent of any subsurface feature being prospected for along said traversing line and repeating steps (b), (c) and (d) at each such new location; and

f. comparing said apparent stacking velocities at each such source detector spread location, by graphically plotting the apparent stacking velocity at each source detector

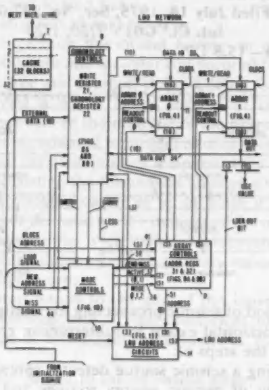
spread location to each selected subsurface reflector as a function of horizontal distance along said traversing line, to observe any differential present in said stacking velocities to each of said selected reflectors as a function of horizontal distance, thereby obtaining the approximately horizontal distance location along said traversing line of any stratigraphic traps in said subterranean region being prospected.

4,008,460

CIRCUIT FOR IMPLEMENTING A MODIFIED LRU REPLACEMENT ALGORITHM FOR A CACHE

Louis R. Bryant, Poughkeepsie; Raymond J. Pedersen, Staatsburg, and Arnold Weinberger, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 24, 1975, Ser. No. 644,006
Int. Cl.² G06F 7/10; G11C 9/06
U.S. Cl. 340—172.5 16 Claims



1. An LRU control system for generating replacement addresses for a buffer level in a storage hierarchy, comprising

at least one memory array having array words at positions corresponding to addresses of replaceable units in the buffer level,

chronology means for generating a chronology use value which is digitally increased by a partial amount for each access to a different replaceable unit in the buffer level, means for inserting the chronology use value into an array word corresponding to the different replaceable unit for which an access is made,

an LRU address circuit for storing the address of a selected replaceable unit which is to be replaced on a next miss signal of the buffer level indicating an access cannot be made because required data is not in the buffer level,

array controls for searching the array words in the memory array on each miss signal for the word having the lowest use value, and storing the address for that word in the LRU address circuit as the replacement address for the next miss, and

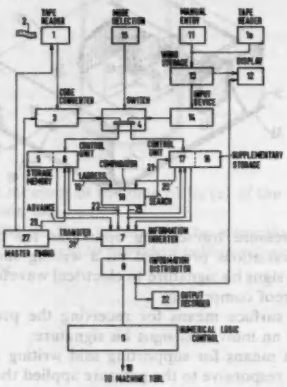
mode controls receiving each miss signal and actuating the array controls to search the memory array for the word having the lowest use value.

4,008,461

APPARATUS FOR CORRECTING AND ADDING DATA TO THAT TAKEN FROM A MECHANICAL DATA CARRIER

Manfred V. Raven, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Sept. 17, 1975, Ser. No. 614,181
Claims priority, application Germany, Sept. 25, 1974, 2445814
Int. Cl.² G05B 19/00
U.S. Cl. 340—172.5 4 Claims



1. In a numerical machine tool control system comprising:

a. a program buffer storage memory;

b. means coupled to the input of said program buffer storage memory for reading control information in the form of records of data each containing an address and an instruction from a mechanical data carrier such as a perforated tape into said buffer storage memory;

c. a numerical logic control having its output coupled to control the machine tool; and

d. means for sequentially calling up the information in said buffer storage memory record by record in the order of addresses associated therewith and providing said records to said numerical logic control, the improvement comprising apparatus for correcting and supplementing information contained on the mechanical data carrier comprising:

e. a supplementary storage memory;

f. means coupled to the input of said supplementary storage memory to enter information in the form of additional records, having addresses the same as at least some of the records entered into said buffer storage memory, into said supplementary storage memory;

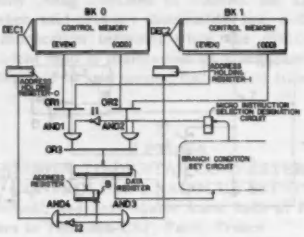
g. means for inserting information interposed between said numerical logic control and said buffer storage memory, said means also having an input from said supplementary memory, for selectively providing to said numerical logic control one of its inputs; and

h. means coupled to control said means for inserting information including means to compare the address of the information being called up from said buffer storage memory for output to said numerical logic control with the addresses stored in said supplementary storage memory and upon finding the same address in said supplementary storage memory to enable said means for inserting information to provide the information stored in said supplementary storage memory to said numerical logic control and otherwise to provide the output of said buffer storage memory to said numerical logic control.

4,008,462
PLURAL CONTROL MEMORY SYSTEM WITH MULTIPLE MICRO INSTRUCTION READOUT

Yasunori Kanda, Kawasaki, Japan, assignor to Fujitsu Ltd., Kawasaki, Japan

Filed Dec. 6, 1974, Ser. No. 530,301
Claims priority, application Japan, Dec. 7, 1973, 48-139211
Int. Cl.² G06F *7/28*, *13/00*; G11C *7/00*
U.S. Cl. 340—172.5 5 Claims



1. A microprogramming control system comprising:

a plurality of control memory means for storing micro instructions, said plurality of control memory means being sequentially addressed with address designations and each addressed control memory means reading out, in turn, a set of plural micro instructions in response to each respective address designation supplied thereto;

means for sequentially addressing said plurality of control memory means with said address designations;

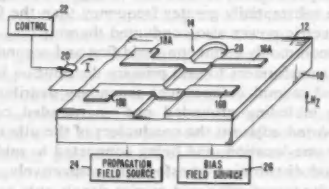
selection gate means connected to said plurality of control memory means operating in time-shared fashion for selecting one of said plural micro instructions in said set as read out from a given one of said sequentially addressed control memory means; and

data register means, connected to said selection gate means and said addressing means, for storing said selected micro instruction, wherein said selected micro instruction contains a bank designating portion for identifying said given one of said plurality of control memory means and a next address designation portion for obtaining the next set of plural micro instructions from said given one of said sequentially addressed control memory means.

4,008,463
INTEGRATED BUBBLE NUCLEATOR

Mark Howard Kryder, Yorktown Heights, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed June 30, 1975, Ser. No. 591,999
Int. Cl.² G11C *11/14*
U.S. Cl. 340—174 TF 15 Claims



1. A current carrying magnetic domain nucleator for nucleating magnetic domains in an amorphous magnetic medium, comprising:

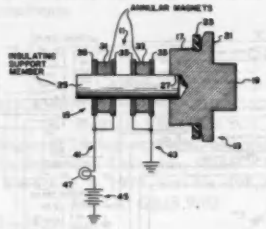
a conductor for carrying said current therethrough, said conductor having a portion thereof which is not continuous and does not provide a continuous electrical path for said current, and

an electrically conducting amorphous magnetic medium capable of supporting said domains therein, said medium electrically contacting said conductor and providing a path therethrough for the flow of said current, said current having a magnitude sufficient to nucleate a magnetic domain in said amorphous magnetic medium.

4,008,464
LUBRICANT CONTAMINATION WARNING DEVICE

James R. Hobbie, Mentor, Ohio, assignor to Eaton Corporation, Cleveland, Ohio

Filed Oct. 7, 1975, Ser. No. 620,453
Int. Cl.² G08B *21/00*
U.S. Cl. 340—239 R 7 Claims



1. Apparatus for providing an electrical warning signal representative of a buildup of ferrous contamination in the lubricant of a mechanism including a housing and rotating gearing, and apparatus being adapted for connection to a source of electrical potential comprising:

a. first and second magnetic members, each of said magnetic members being generally annular in configuration and having an aperture therein;

b. means received in said aperture in each of said magnetic members for fixedly positioning said magnetic members within the housing so as to be exposed to the normal lubricant flow, said magnetic members being spaced apart to define a gap;

c. said positioning means electrically insulating said first magnetic member from said second magnetic member; and

d. normally-open electrical circuit means including a first circuit portion connected to one of said magnetic members and adapted for connection to said source of electrical potential, and a second circuit portion connected to the other of said magnetic members, said magnetic members being operably disposed to close said normally-open circuit when ferrous contamination on said first magnetic member comes into contact with ferrous contamination on said second magnetic member.

4,008,465
KEYLESS ANTI-THEFT ENTRY SYSTEM

Herbert C. Le Doux, 136 Seaman Ave., New York, N.Y. 10034

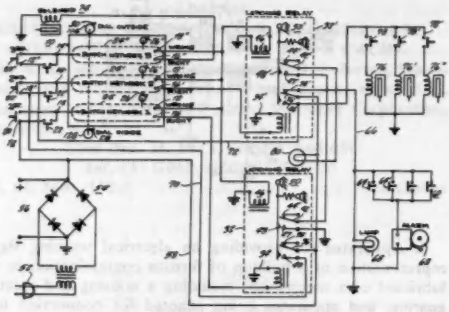
Filed Mar. 29, 1976, Ser. No. 671,386
Int. Cl.² G08B *13/08*
U.S. Cl. 340—274 C 10 Claims

1. An anti-theft entry system for guarding a premises comprising:

a. selector switch means having a plurality of sections, each section including: an input terminal, an output terminal, and an intermediate terminal, a rotary dial means coupled between the intermediate terminal and the output terminal, said rotary dial means having a plurality of positions and capable of being preset to interconnect said last two mentioned terminals when dialed to a particular position, button switch means coupled between the input terminal and the intermediate terminal;

b. a plurality of latching means each respectively associated

with a section of said selector switch means, each of said latching means including: a relay coil coupled to the output terminal of its respective section and energized when the respective button switch means is closed and the preset position is dialed on its respective rotary dial means, a relay switch activated by said relay coil to close from a normal position to an active position, reset means coupled to the output terminal of its respective section and energized when its respective button switch means is closed and its respective rotary dial means is set to any position other than its preset position, said reset means returning its respective relay switch back to its normal position, the active position of the relay switches of each latching means, with the exclusion of one, being interconnected to the input terminal of a different section of the selector switch means in a predetermined sequence,



wherein the excluded relay switch is the last in the sequence;

c. energy supply means coupled to each of said relay switches and also coupled to the input terminal of the remaining section of the selector switch means not interconnected to any active position;

d. alarm circuit means coupled to the normal position of the excluded relay switch; and

e. entry means coupled to the active position of the excluded relay switch for releasing a window, door, or the like,

whereby when the button switch means are depressed in the predetermined sequence, and for each button being depressed its respective dial means is positioned to its corresponding present position, said alarm circuit will be disengaged and only authorized entry can be obtained into the premises into the premises by entry means.

4,008,466

DEVICE FOR INDICATING ANGULAR POSITION AND DEPTH OF A TOWED VEHICLE

William V. Smith, 1617 Duke St., Memphis, Tenn. 38108

Filed Nov. 7, 1975, Ser. No. 629,966

Int. Cl.² G08B 21/00; B60Q 9/00

U.S. Cl. 340—282 **6 Claims**

1. An indicator for indicating the relative angular relationship between a towed vehicle and a towing vehicle to which the towed vehicle is coupled, the indicator comprising:

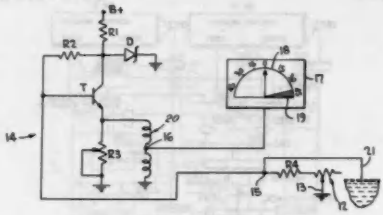
a housing to be mounted on one of the vehicles and said housing having a laterally extending slot therein;

a movable arm having one end to be coupled to the other of the vehicles, said movable arm having its other end coupled to said housing mounted on one of the vehicles and being slidable along said slot;

a variable slide resistor arranged within said housing and being coupled to said other end of said movable arm, said variable slide resistor providing a resistance varying in dependence upon the relative angular movement between the coupled towed vehicle and towing vehicle;

electrical measuring means having an input terminal electrically coupled to said variable slide resistor and providing an output signal varying in dependence upon variations in the resistance of said variable slide resistor;

a volt meter coupled to receive the output signal from said electrical measuring means and providing an indication of the relative angular relationship between the coupled towed vehicle and towing vehicle and,



a water sensor indicator having a water sensing member to be mounted on a towed vehicle and serving to effectively couple said input terminal of said electrical measuring means to the towed vehicle's frame when said water sensing member comes into contact with water for causing said electrical measuring means to provide a maximum output signal thereby causing a maximum indication on said volt meter.

4,008,467

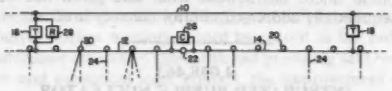
POWER LINE CARRIER COMMUNICATION SYSTEM HAVING EFFICIENT CARRIER SIGNAL COUPLING OF DISTRIBUTION SECONDARY LINES

Tamas I. Pattantyus-Abraham, Wilkins Township, and Ian A. Whyte, Churchill Borough, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 16, 1975, Ser. No. 613,835

Int. Cl.² H04M 11/04

U.S. Cl. 340—310 A **6 Claims**



1. A power line carrier communication system for communicating with first and second electric power customer locations separately served by first and second distribution transformers, respectively, of a distribution line system, said communication system comprising:

a primary distribution line transmitting carrier signals having a substantially greater frequency than the frequency of electric power also conducted therein;

means commonly connecting said first and second distribution transformers to said primary distribution line;

first and second independent secondary distribution lines each including grounded and ungrounded conductors supported adjacent the conductors of the other line at at least one location, and being connected to said first and second distribution transformers, respectively;

means for transferring said carrier signals only around said first distribution transformer;

means for connecting a first electrical load at said first customer location to said first secondary distribution line and a second electrical load at said second customer location to said second secondary distribution line;

first and second communications terminals respectively coupled to first and second secondary distribution lines near the electrical loads at said first and second customer

locations, said terminals operating at the carrier signal frequency; and

means for interconnecting said first and second secondary distribution lines at the adjacently supported location, said interconnecting means providing a substantially low-attenuation path between the secondary distribution lines for signals at the carrier frequency, and providing a substantially high-attenuation path between the secondary distribution lines for signals at the power frequency thereby being effective to transfer the carrier signals between said primary distribution line and said second communication terminal while the associated second electrical load is maintained in a separately connected relationship to said second distribution transformer.

4,008,468

ANALOGUE-TO-DIGITAL CONVERTER WITH CONTROLLED ANALOGUE SETTING

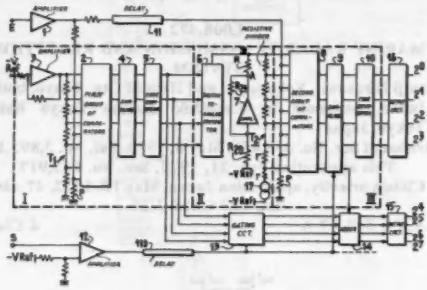
Claude Imhoff, and Jean Marie Aure, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Mar. 12, 1975, Ser. No. 557,478

Claims priority, application France, Mar. 15, 1974, 74.08883

Int. Cl.² H03K *13/02*

U.S. Cl. 340—347 AD **10 Claims**



1. A high-speed encoder of the series-parallel type for converting analogue input voltages into combinations of bits, comprising:

a first and a second encoder section respectively including a first group of comparators and a second group of comparators each having a test input and a reference input;

a source of first threshold voltages, separated by relatively large increments $\Delta V1$, respectively applied to the reference inputs of said first group of comparators;

a source of second threshold voltages, separated by relatively small increments $\Delta V2$, respectively applied to the reference inputs of said second group of comparators;

first circuit means for feeding an analogue input voltage in parallel to the test inputs of all the comparators of said first group with resulting generation of a set of higher-order bits in an output of said first encoder section;

second circuit means for feeding said analogue input voltage in parallel and with a predetermined delay to the test inputs of all the comparators of said second group with resulting generation of a set of lower-order bits in an output of said second encoder section, each comparator of said second group responding to a predetermined relationship between the voltages on its test and reference inputs by changing from an unswitched state with flow of biasing current in its reference input to a switched state with flow of biasing current in its test input; and

a control network including digital-to-analogue conversion means connected to the output of said first encoder section for concurrently shifting said second threshold voltages in response to said higher-order bits to hold said analogue input voltage within the operating ranges of said second group of comparators, said source of second threshold voltages including a resistive voltage divider connected in series with a fixed resistor R across a constant-current generator and consisting of p segments of resistance r forming p junctions with one another and with said fixed resistor, p being the number of comparators in said second group, said junctions being respectively connected to the reference inputs of the comparators of said second group, said control network being in series with said fixed resistor only for modifying the voltage drop thereacross by multiples of $\Delta V1$, the current I delivered by said generator being less than a current Io required to make the total voltage drop prI across said voltage divider equal to $\Delta V1$, the difference $Io - I$ substantially compensating for threshold errors due to said biasing currents.

4,008,469

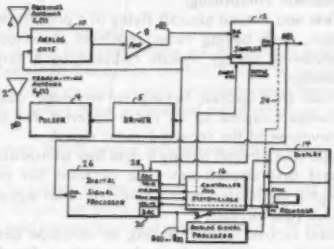
SIGNAL PROCESSING IN SHORT-PULSE GEOPHYSICAL RADAR SYSTEM

Jamie C. Chapman, Lexington, Mass., assignor to Terrestrial Systems, Incorporated, Lexington, Mass.

Filed Aug. 6, 1974, Ser. No. 495,259

Int. Cl.² G01S *9/02*

U.S. Cl. 343—5 NA **6 Claims**



1. In a geophysical radar system comprising:

A. transmitting means for transmitting repetitive short radar pulses into the earth,

B. receiving means for detecting reflected radar energy returned as the repetitive pulses are reflected from various discontinuities at various depths within the earth, and

C. output means for providing an indication of the reflected radar energy in a form which is intelligible to a human observer,

the improvement comprising:

D. deriving means responsive to the detected radar energy for deriving a sequence of digital representations of the amplitude of the reflected energy as said reflected energy is detected by the receiving means at another corresponding sequence of instants in time, each of said instants occurring at individually selected amounts of time after each corresponding transmitted pulse is transmitted into substantially the same part of the earth, whereby the digital representations represent whatever discontinuities are present at corresponding depths into the earth,

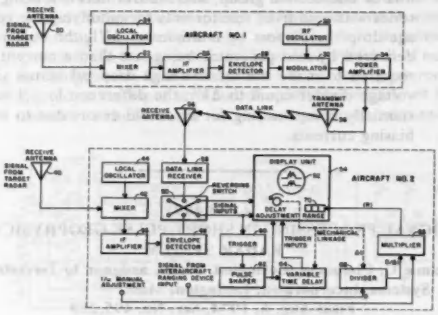
E. selecting means for selecting said individually selected amounts of time according to the attenuation suffered by reflected radar energy as received at the receiving means from said selected depths such that a greater plurality of said digital representations are derived for selected depths suffering greater attenuation than are derived for selected depths suffering lesser attenuation, and

F. combining means for combining all of the sequence of digital representations formed at one depth at substantially one part of the earth to form a combined representation with improved signal-to-noise ratio.

4,008,470
PASSIVE RANGING SYSTEM

George R. Lanning, Corona, and John Y. K. Chang, Riverside, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 27, 1968, Ser. No. 710,703
Int. Cl.[2] G01S 9/04
U.S. Cl. 343—6 A 4 Claims



1. In a passive airborne ranging system for determining the range of target radars located on the surface of the earth, the combination comprising:

a. first and second aircraft flying in a predetermined formation, each having radar receivers mounted therein for receiving energy signals radiated by a target radar of interest,

b. said first aircraft having an envelope detector circuit means coupled to its radar receiver for detecting the envelope of the received radar signal,

c. said first aircraft having a data link transmitter coupled to said first aircraft envelope detector for transmitting a signal modulated by the detected radar signal received by said first aircraft,

d. said second aircraft having an envelope detector circuit means coupled to its radar receiver for detecting the envelope of the received radar signal,

e. said second aircraft having data links receiving means for receiving and detecting the transmitted signal from said first aircraft,

f. signal comparison means coupled to the envelope detector of said second aircraft and to said data link receiving means for producing an output signal proportional to the approximate range of the target radar to said second aircraft.

4,008,471
CORRELATOR TO REDUCE BIN STRADDLE IN A COLLISION AVOIDANCE SYSTEM

James Robert Hall, Canoga Park, and John Jeffrey Lyon, Chatsworth, both of Calif., assignors to RCA Corporation, New York, N.Y.

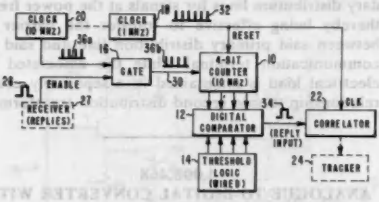
Filed Dec. 22, 1975, Ser. No. 643,026
Claims priority, application United Kingdom, Apr. 14, 1975, 15219/75
Int. Cl.[2] G01S 9/56
U.S. Cl. 343—6.5 LC 2 Claims

1. A circuit for correlating pulse reply signals generated by remote stations in response to probe signals from interrogation stations, said circuit including a correlator of the type having sequenced storage means for storing and sequencing at a given rate into bins signals applied to an input of said correlator corresponding to said reply signals, a significant portion of said reply signals having a width greater than a predetermined portion of the width of said bins, said correlator including counting means for counting said reply signals, the improvement comprising:

means for sampling said received pulse reply signals at a rate significantly greater than the rate of sequencing said storage bins;

means for counting said sampled signals at said given rate to provide a count of sampled signals;

means for comparing said sample count to a threshold value to generate thereby a thresholded output signal to increment said correlator counting means for samples producing a count greater than said threshold; and

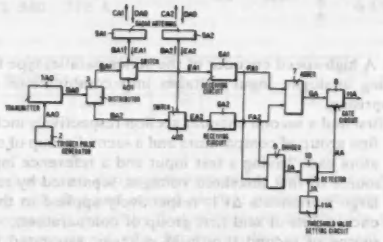


means for coupling said thresholded output signal to said correlator counting means whereby only those reply signals exceeding a predetermined portion of a correlator range bin will increment the count of reply signals in said correlator.

4,008,472
MARINE RADAR TRANSMISSION AND RECEPTION SYSTEM

Tomiji Nirasawa, Yokohama, and Hiroshi Ota, Tokyo, both of Japan, assignors to Kabushiki Kaisha Tokyo Keikio, Tokyo, Japan

Division of Ser. No. 358,456, May 8, 1973, Pat. No. 3,893,117.
This application Feb. 21, 1975, Ser. No. 551,917
Claims priority, application Japan, May 10, 1972, 47-46033
Int. Cl.[2] G01S 7/28
U.S. Cl. 343—7 A 4 Claims



2. A marine radar transmission and reception system comprising:

a. means for generating first and second transmission pulse radar waves of first and second carrier wave lengths, respectively;

b. first and second antennae for emitting the first and second transmission pulse waves in the same direction as first and second pulse radar waves respectively and receiving first and second reflected pulse waves of the first and second emitted pulse radar waves respectively;

c. first and second receiving circuits supplied with the outputs of the first and second antennae respectively;

d. a gate circuit for gating the output of the first or second receiving circuit or the sum of the outputs of the first and second receiving circuits; and

e. control means having a quotient circuit for producing the quotient of the outputs of the first and second receiving circuits, a setting circuit for deriving a predetermined threshold value output and a detector for detecting

whether or not the quotient is in excess of the threshold value output;

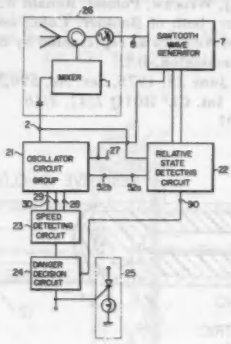
f. in which the gate circuit is controlled with the output of the detector of the control means, whereby sea clutter eliminated received pulse radar waves are obtained from the gate circuit.

4,008,473

COLLISION PREDICTING OPERATION SYSTEM

Matatoyo Hinachi, Nagoya; Kazuo Oishi, Oobu; Toshiaki Kato, Nishio; Takeshi Matsui, Kariya, and Takashi Yamada, Anjo, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Jan. 14, 1974, Ser. No. 433,405
Claims priority, application Japan, Jan. 20, 1973, 48-8810
Int. Cl.² G01S 9/44
U.S. Cl. 343—7.5 **4 Claims**



1. A collision predicting operation system comprising:

electromagnetic wave generating means whose oscillation frequency is varied in accordance with an input voltage thereto;

antenna means for radiating said electromagnetic wave and for receiving a reflected wave reflected from a target due to the encounter of said electromagnetic wave with said target;

means for causing said reflected wave to interfere with a part of said electromagnetic wave to generate a doppler signal;

periodic wave generating means connected to said doppler signal generating means and including circuitry responsive only to a doppler signal having an amplitude higher than a predetermined value and a frequency within a predetermined range to produce a periodic wave synchronized with said doppler signal and having a rise portion occurring when the phase angle of the doppler signal is zero;

frequency modulating means connected to said electromagnetic wave generating means and said periodic wave generating means, said frequency modulating means including circuit means response to the rise of said periodic wave for changing the input voltage to said electromagnetic wave generating means in synchronization with the occurrence of said zero phase angle of said doppler signal thereby changing the oscillation frequency of said electromagnetic wave generating means; and

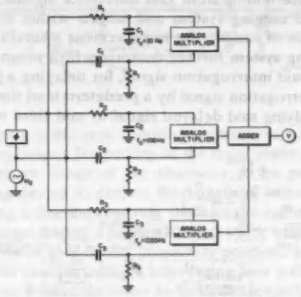
means for detecting the polarity and phase of the modulated portion of said doppler signal.

4,008,474

DOPPLER RADAR FOR DISTINGUISHING BETWEEN APPROACHING AND RECEDING TARGETS AND HAVING INCREASED FREQUENCY RESPONSE

Otto E. Rittenbach, Neptune, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 18, 1975, Ser. No. 588,087
Int. Cl.² G01S 9/42
U.S. Cl. 343—7.7 **2 Claims**



1. A Doppler radar for indicating approaching and receding targets comprising:

a first mixer-filter means;

a first phase shifter means;

transmitter means for transmitting a CW beam of energy of a predetermined frequency toward a moving target and for transmitting energy at said predetermined frequency to said first mixer-filter means and said first phase shifter means;

receiver means for receiving reflections of said transmitted CW beam of energy;

said first mixer-filter means connected to the output of said receiver means for producing the difference frequency between said transmitted and said reflected CW beams of energy;

a second mixer-filter means connected to the outputs of said receiver means and said first phase shifter means for producing the difference frequency between said reflected CW beam of energy and the output of said first phase shifter means;

a plurality of parallel connected circuit means;

each said circuit means including a frequency responsive phase shifter means connected to the output of said first and second mixer-filter means for providing a relative phase shift of 90 degrees between the output signals of said first and said second mixer-filter means;

each said frequency responsive phase shifter means tuned to different overlapping frequency bands;

each said parallel connected circuit means including a multiplier means connected to the outputs of the respective one of said frequency responsive phase shifter means for producing a DC output voltage; and

means connected to the output of each said multiplier means for summing said DC output voltages.

4,008,475

STABILIZING AND CALIBRATION CIRCUIT FOR FM-CW RADAR RANGING SYSTEMS

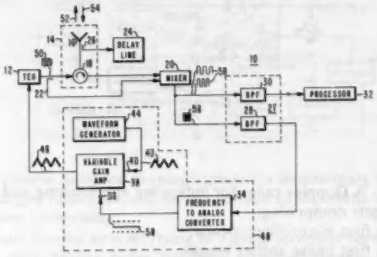
Henry Charles Johnson, Neshanic, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Nov. 12, 1975, Ser. No. 631,325
Int. Cl.² G01S 9/23, 9/02
U.S. Cl. 343—14 **4 Claims**

1. In a frequency-modulated continuous wave ranging system of the type including: first means for generating a continu-

ous wave interrogation signal, said interrogation signal being frequency modulated in accordance with the amplitude of a predetermined waveform, the amplitude of said predetermined waveform being periodic at a predetermined rate and having a predetermined maximum amplitude; second means for transmitting said interrogation signal to targets and receiving reflected signals from said targets in response thereto; third means for deriving difference signals indicative of the frequency differences of said reflected signals from the instantaneous frequency of said interrogation signal; and fourth means for determining from said difference signals the range between said ranging system and targets within a predetermined domain of ranges, the improvement wherein:

said ranging system further comprises fifth means, responsive to said interrogation signal, for delaying a portion of said interrogation signal by a predetermined time interval and applying said delayed signal to said third means;



said delayed signal corresponding to a reflected signal from a target at a predetermined range outside of said predetermined range domain;

sixth means, responsive to said difference signals, for generating first and second output signals, said first output signal consisting substantially of difference signals corresponding to said predetermined range and said second output signal consisting substantially of said difference signals corresponding to ranges within said predetermined range domain,

said second output signal being applied to said fourth means; and

seventh means, responsive to said sixth means first output signal, for changing the product of said periodic rate and said maximum amplitude of said predetermined waveform in accordance with the difference corresponding to said predetermined range.

4,008,476

DIGITAL ANTENNA PATTERN GENERATOR FOR RADAR SIMULATION

Albert B. Evans, Jr., Ventura, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 3, 1975, Ser. No. 619,533

Int. Cl.² G01S 7/40

U.S. Cl. 343—17.7 **11 Claims**

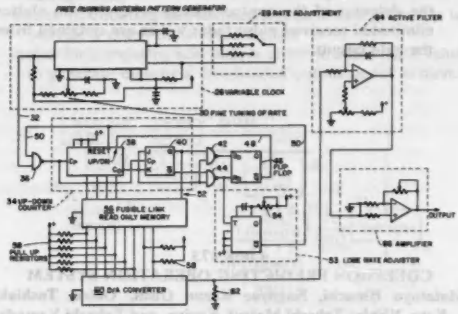
1. An antenna pattern generator for producing an output signal representative of an antenna beam pattern comprising:

a. means for converting an analog waveform into a digital signal having a magnitude proportional to angular displacement across said antenna beam pattern;

b. read only memory means addressed in accordance with said magnitude of said digital signal to produce a digital pattern signal having a preselected magnitude proportional to said antenna beam pattern;

c. means for converting said digital pattern signal into an analog antenna beam pattern signal; and

d. means for filtering said analog antenna beam pattern



signal to produce said output signal representative of said antenna beam pattern.

4,008,477

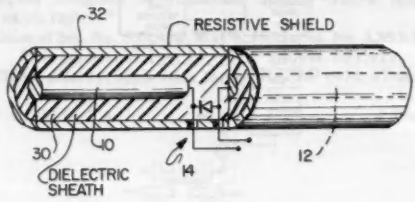
ANTENNA WITH INHERENT FILTERING ACTION

Tadeusz M. Babij, Wrocaw, Poland; Ronald R. Bowman, and Paul F. Wacker, both of Boulder, Colo., assignors to The United States of America as represented by the Secretary of Commerce, Washington, D.C.

Filed June 25, 1975, Ser. No. 590,355

Int. Cl.² H01Q 1/42, 3/16

U.S. Cl. 343—701 **1 Claim**



1. An antenna with inherent filtering action for shaping the frequency response curve thereof, said antenna comprising, in combination, at least one elongated receiving element constructed of an electrically-conductive material; a dielectric sheath surrounding said receiving element; a resistive shield surrounding said dielectric sheath, and a detector directly coupled to said receiving element; whereby a distributed parameter RC filter is formed decreasing the low-frequency response of said antenna.

4,008,478

RIFLE BARREL SERVING AS RADIO ANTENNA

Kurt Ikrath, Elberon; William Kennebeck, Sea Bright, and Jack Wills, Ocean Grove, all of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 31, 1975, Ser. No. 645,722

Int. Cl.² H01Q 1/00, 1/36

U.S. Cl. 343—720 **4 Claims**

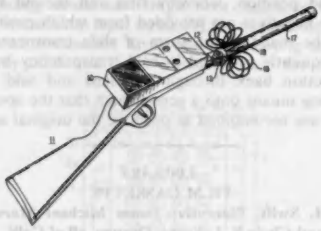
1. In combination:

a. a weapon having an elongated, electrically-conductive barrel;

b. a radio-frequency transceiver providing an r.f. output and being mounted to said weapon;

c. a helical toroidal r.f. transformer coil co-axially mounted about said barrel and coupling said r.f. output to said barrel, said barrel acting as the antenna for said transceiver and as a low-impedance secondary load for said toroidal transformer; and

d. means for insulating said toroidal transformer coil from said conductive barrel, said toroidal transformer coil



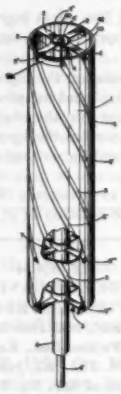
extending transversely around said insulating means and barrel.

4,008,479

DUAL-FREQUENCY CIRCULARLY POLARIZED SPIRAL ANTENNA FOR SATELLITE NAVIGATION

Valor Clark Smith, LeMesa, Calif., assignor to CHU Associates, Inc., Littleton, Mass.

Filed Nov. 3, 1975, Ser. No. 628,047
Int. Cl.² H01Q 1/36
U.S. Cl. 343—895 9 Claims



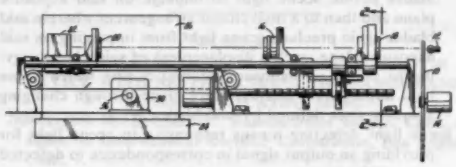
1. An omnidirectional circularly polarized antenna for satellite communication and the like having, in combination, a longitudinal insulating member; transmission-line means extending longitudinally within said member and connected near the ends of said member and at an intermediate position thereof to transversely extending conductive feed connector means; first and second interleaved sets of substantially parallel conductive strips extending longitudinally along the member; means for connecting adjacent strips of the first and second sets together at one of their ends near one end of said member and to the said connector means near said one end of the member; means for connecting the other ends of the first set of strips to the said connector means near said other end of said member; and means for connecting the other ends of the second set of strips to said connector means at the said intermediate position in order to produce substantially the same omnidirectional pattern of radiation coverage directed upward of said member and over a band of wavelengths including those corresponding to the dimensions of the strips of said first and second sets of strips.

4,008,480

PHOTOCOMPOSITION ESCAPEMENT DRIVE SYSTEM

Francis S. Szabo, Morristown, N.J., assignor to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed June 16, 1975, Ser. No. 586,922
Int. Cl.² B41B 13/10
U.S. Cl. 354—5 4 Claims



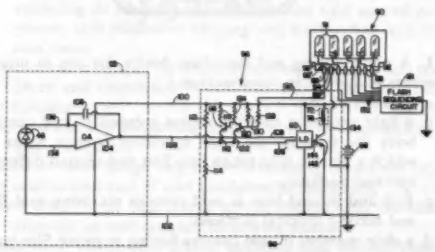
1. A photographic type composing apparatus having a collimating lens, means for putting in the focal plane of the collimating lens an image of the character to be projected, an illuminating device to project the images of selected characters forming a line successively through the collimating lens, each character having a predetermined width value and being projected while it is in the projection position, a translating lens combination including a converging lens and a reflector arranged one behind the other to focus the projected light and reflect it through a predetermined angle, a support to hold a sensitized surface in substantial coincidence with the focal plane of the light leaving the lens combination, characterized by an improved means for displacing the lens combination relative to the collimating lens and longitudinally of the surface after each projection by variable distances proportional to the widths of the corresponding characters, comprising, a stepper motor primary drive means, and a mechanical motion reducer system means for dividing a step of said motor into a reduced output motion, wherein the stepper motor has a step movement at least twice the required step size to position the lens combination at all possible required distances and wherein the mechanical motion reducer system is a flexible line driven by a line spool carried by the motor, and the line is reeved around a stationary position turning surface, a similar turning surface carried by the carriage, and extends back toward the stationary turning surface to a anchor point in a block and tackle configuration to reduce the motor output at least by half the length of line taken up in one motor step.

4,008,481

EXPOSURE CONTROL SYSTEM WITH SEPARATE FLASH AND AMBIENT TRIGGER LEVELS

George D. Whiteside, Lexington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Oct. 3, 1975, Ser. No. 619,383
Int. Cl.² G03B 7/14
U.S. Cl. 354—27 17 Claims



1. A photographic camera for alternate use in ambient and artificial scene lighted conditions comprising:

a housing;

means within said housing for receiving a source of electrical energy;

means within said housing for defining a film exposure plane;

a pair of aperture shutter blades;

means for mounting said blades for selective simultaneous displacement from an initial closed arrangement wherein said blades preclude scene light from impinging on said exposure plane to an open arrangement wherein said blades permit scene light to impinge on said exposure plane and then to a final closed arrangement wherein said blades again preclude scene light from impinging on said exposure plane, such a displacement of said blades serving to define an exposure interval during which scene light impinges on said exposure plane through changing aperture sizes defined by said blades;

scene light detecting means responsive to scene light for providing an output signal in correspondence to detected scene light;

means for actuating said mounting means to initiate displacement of said blades from their said initial closed arrangement towards their said open arrangement thereby commencing said exposure interval and for subsequently actuating said mounting means in correspondence with said output signal to initiate the displacement of said blades into their said final closed arrangement; and

means inoperative during exposure operations involving only ambient scene lighted conditions for selectively increasing the correspondence relationship between said output signal and scene light detected by said detecting means to facilitate exposure operations involving artificial scene lighted conditions, the rendering of said correspondence increasing means operative resulting in an increase of detected scene light in order for said detecting means to provide the same output signal under artificial scene lighted conditions as otherwise provided by said detecting means under ambient scene lighted conditions.

4,008,482

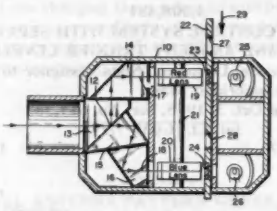
COLOR CODING AND DECODING SYSTEM FOR USE IN MICROGRAPHICS

Paul Wentworth Lang, P.O. Box 1000, Orange, Calif. 92668

Filed Nov. 24, 1975, Ser. No. 634,522

Int. Cl.² G03B *33/10*

U.S. Cl. 354—104 **3 Claims**



1. A color coding and decoding device for use in micrographics including, in combination:

a. a camera body;

b. a light spectrum dividing means secured in said camera body for splitting the light spectrum from a scene of which a picture is to taken into first and second different spectral portions;

c. first and second lens in said camera receiving said first and second spectral portions;

d. a slide member in said camera having negative film holding means for holding first and second black and white film negatives in said camera in positions behind said first and second lens respectively for exposure to spectral bands within said first and second spectral portions, when the slide member is in a first position; and

e. projection light means behind said holding means, said holding means also including transparency holders for holding transparencies behind said lens and permitting light to pass from said projection light means through the transparencies when said slide member is moved to a second position, whereby first and second black and white negatives are provided from which positive prints may be made in the form of slide transparencies and subsequently received in said transparency holders for projection back through said lens and said spectrum dividing means onto a screen such that the spectral portions are recombined to produce the original scene.

4,008,483

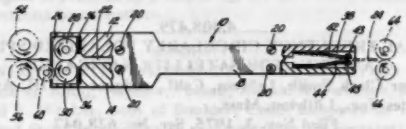
FILM CASSETTE

William R. Swift, Placentia; James Michael Marsh, Yorba Linda, and Clyde E. LeFevre, Orange, all of Calif., assignors to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed Sept. 22, 1975, Ser. No. 615,474

Int. Cl.² G03B *17/26*

U.S. Cl. 354—277 **10 Claims**



1. A cassette for transporting a film sheet from one station to another without exposing the film sheet to ambient light comprising:

an enclosure having film sheet ingress and egress ends including top and bottom walls secured to a pair of side walls;

a pair of rollers mounted at the ingress end of the enclosure affording a light seal and adapted for receiving and advancing a film sheet into the enclosure;

resilient means mounted at the egress end of the enclosure providing a light seal for exiting of a film sheet from the enclosure;

said rollers adapted to advance a film sheet into the enclosure in response to rotation of at least one of the rollers.

4,008,484

SEMICONDUCTOR DEVICE HAVING MULTILAYERED ELECTRODE STRUCTURE

Shunichi Maekawa, Itami, and Hitoshi Kisaki, Kobe, both of Japan, assignors to Fujitsu Ltd., Kawasaki, Japan

Continuation of Ser. No. 373,082, June 25, 1973, abandoned, which is a continuation of Ser. No. 218,553, Jan. 17, 1972, abandoned, which is a continuation of Ser. No. 813,648, April 4, 1969, abandoned. This application June 23, 1975, Ser. No. 589,576

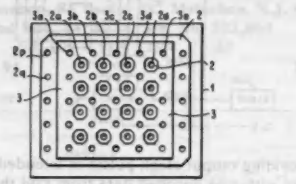
Claims priority, application Japan, Apr. 4, 1968, 43-22262

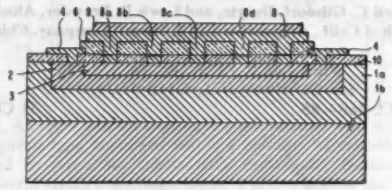
Int. Cl.² H01L *29/72*

U.S. Cl. 357—36 **3 Claims**

1. A semiconductor high frequency high power device having a multilayered electrode structure comprising a semiconductor substrate of one conductivity type, a first base region of the opposite conductivity type formed on one surface of said substrate, a second single area emitter region of the same conductivity type as the substrate formed on said first region, a first insulating film for covering and protecting parts of pn junctions formed between said first region and said substrate that are exposed on the surface of said substrate, a first conductive layer formed on said first insulating film and having ohmic contact with said first region through holes opened in said first insulating film, a second insulating film covering the upper surface of said first conductive layer leaving at least a part of the peripheral parts of said first conductive layer uncovered, and a second conductive layer of high resistivity penetrating through said first insulating film and said second insulating film at a plurality of spaced points and

having ohmic contact with said second single area region emitter forming resistors separately contacting said single area of the second region at multiple points, without any said resistor extending across said single area region to the borders thereof, and a metal layer on nearly the entire outer surface of said second conductive layer and constituting an electrode sufficiently thick and low in resistivity that the entire outer





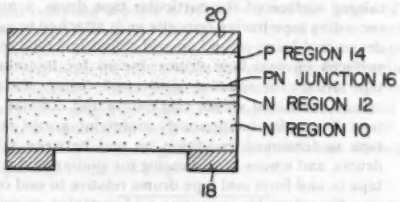
surface of the second conductive layer parallel to the surface of the substrate is of substantially the same potential during operation, whereby the voltage drop in the second conductive layer during operation is perpendicular to the substrate to prevent local crowding of current, and whereby when current flows in the semiconductor device a uniform potential distribution is produced on the emitter semiconductor region as a result of the currents flowing in said resistors.

4,008,485

GALLIUM ARSENIDE INFRARED LIGHT EMITTING DIODE

Tadahiko Miyoshi, Hitachi; Yasutoshi Kurihara, Katsuta, and Mitsuru Ura, Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

Filed June 20, 1975, Ser. No. 588,833
Claims priority, application Japan, June 24, 1974, 49-71341
Int. Cl.² H01L *33/00*
U.S. Cl. 357—17 **14 Claims**



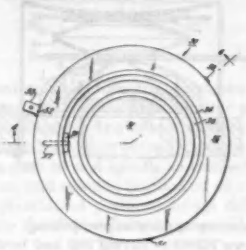
1. A gallium arsenide light emitting diode comprising a semiconductor body with a pair of principal surfaces, said semiconductor body including (i) a first region of GaAs doped with at least one selected from the group consisting of Sn, Se, Te and S and having an n conductivity type, a first electrode being provided in ohmic contact with that surface of said first region which forms one of said principal surfaces of said semiconductor body, (ii) a second region of GaAs doped with Si and having an n conductivity type, said second region being disposed adjacent to said first region, and (iii) a third region of GaAs doped with Si and having a p conductivity type, said third region being disposed adjacent to said second region, a second electrode being provided in ohmic contact with that surface of said third region which forms the other principal surface of said semiconductor body.

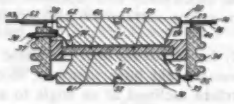
4,008,486

COMPRESSION-ASSEMBLED SEMICONDUCTOR DEVICE WITH NESTING CIRCULAR FLANGES AND FLEXIBLE LOCATING RING

Mieczyslaw W. Byczkowski, Rancho Palos Verdes, Calif., assignor to International Rectifier Corporation, Los Angeles, Calif.

Filed June 2, 1975, Ser. No. 582,610
Int. Cl.² H01L *23/02, 23/12, 23/42, 23/44*
U.S. Cl. 357—74 **8 Claims**





1. A compression bonded assembly for a semiconductor device comprising, in combination:

first and second spaced pole pieces; said first and second pole pieces having respective facing surfaces which are flat and parallel and which are adapted to engage corresponding surfaces of a semiconductor wafer;

a semiconductor wafer having flat parallel opposing surfaces disposed between and engaging said respective surfaces of said first and second pole pieces;

an insulation housing ring radially spaced from and concentrically surrounding said first and second pole pieces and enclosing at least the volume between said spaced pole pieces; said insulation housing ring having first and second ends;

first circular flange ring means extending from said first pole piece and connected to said first end of said insulation housing;

second circular flange ring means extending from said second pole piece;

third circular flange ring means extending outwardly from said second end of said insulation housing ring;

said third flange ring means having substantially the same diameter as said second flange ring means;

said third flange ring means engaging said second flange ring means in surface-to-surface contact;

at least three discrete bent tabs extending across the outer circumferential peripheries of said second and third flange ring means for centering said second and third flange ring means relative to one another; said at least three bent tabs being circumferentially spaced from one another; each of said at least three bent tabs extending

from the same one of said second or third flange ring means, the other of said second or third flange ring means defining a circular disc without extensions thereon.

4,008,487

SEMICONDUCTOR COMPONENT WITH PRESSURE CONTACT

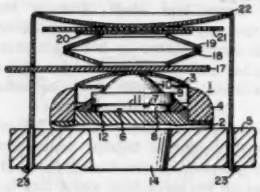
Herbert Vogt, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed July 15, 1975, Ser. No. 596,139

Claims priority, application Germany, July 24, 1974, 2435637

Int. Cl.² H01L 23/02, 23/48, 23/42

U.S. Cl. 357—81 **6 Claims**



1. A semiconductor apparatus comprising

a semiconductor element having top and bottom opposed, substantially parallel major surfaces;

a top electrode electrically and mechanically connected to said top major surface of said semiconductor element;

a base member electrically and mechanically connected to said bottom major surface of said semiconductor element;

a cooling body for removing heat from said semiconductor element through said base member, said cooling body having a surface inclined at an angle to a line normal to said major surfaces of said semiconductor element, said angle being greater than 0° and less than 45° said inclined surface mating with a corresponding inclined surface of said base member; and,

means retained in said apparatus for exerting and maintaining a force normal to said major surfaces of said semiconductor element, said means applying downward pressure on said top electrode and upward pressure on said cooling body, whereby said semiconductor element is held in compression between said top electrode and said base member, and said cooling is held in compression against said base member at said inclined mating surfaces.

4,008,488

MAGNETIC RECORDING DATA DECODING SYSTEM

George T. Osborne, Rush City, Minn., assignor to Braemar Computer Devices, Inc., Burnsville, Minn.

Filed Aug. 25, 1975, Ser. No. 607,351

Int. Cl.² G11B 5/02

U.S. Cl. 360—51 **12 Claims**

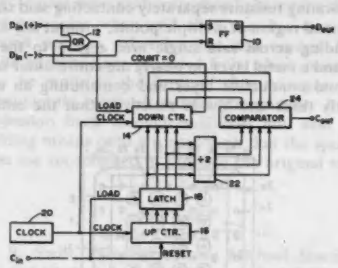
1. For use in a data recording system having at least one data track and a clock track recorded on a magnetic recording medium, a decoding system comprising:

first means for providing a representation of the clock period derived from said clock track;

second means for providing a representation of said clock period in phase relationship with data derived from said data track;

third means for providing decoded output data from such data track; and

fourth means operative in response to said second means for



providing output clock pulses in intended phase relationship with said decoded data from said third means.

4,008,489

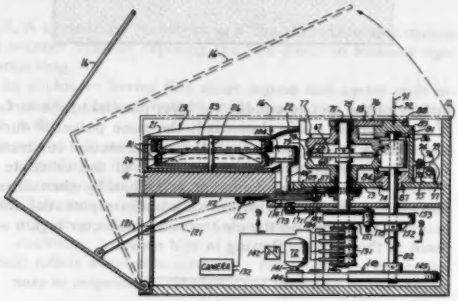
PORTABLE VIDEO TAPE RECORDER

Richard C. Gilsdorf, Duarte, and Lewis B. Browder, Altadena, both of Calif., assignors to Bell & Howell Company, Chicago, Ill.

Filed Jan. 9, 1975, Ser. No. 539,758

Int. Cl.² H04N 5/78; G11B 15/28, 15/43

U.S. Cl. 360—85 **31 Claims**



1. Apparatus for recording video information, comprising in combination:

a portable unit;

means including a video camera in said unit for generating composite electric video signals;

a cartridge including a casing having an opening, a pair of cylindrical tape drums located in said casing, each tape drum having a cylindrical tape retaining surface and all portions of each tape drum being located within an imaginary cylindrical surface extending through the tape retaining surface of the particular tape drum, a magnetic recording tape having opposite ends attached to said tape drums and being wound on said cylindrical tape retaining surfaces on said tape drums, means for mounting said tape drums for rotation inside said casing, mechanical means contained within said casing and coupled to said tape drums for continuously maintaining said magnetic tape in tensioned condition on and between said tape drums, and means in said casing for guiding said magnetic tape to and from said tape drums relative to said opening;

means for releasably mounting said cartridge on said unit;

a magnetic tape drive and recording assembly supported by said unit in spaced relationship to said cartridge, said tape drive and recording assembly including rotatable magnetic recording head means for magnetically recording said composite electric video signals on said magnetic recording tape, rotatable tape drive capstan means at said magnetic recording head means, and for rotating said recording head means and said tape drive capstan means; and

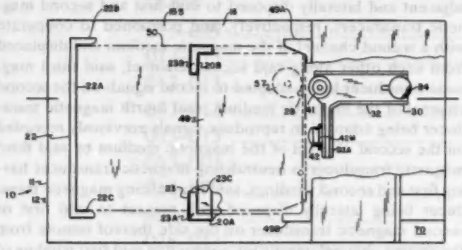
means for extracting magnetic tape from said cartridge via said opening and for placing said extracted tape about at least part of said tape drive capstan means and recording head means.

4,008,490

MULTIPLE MAGAZINE TRANSDUCING APPARATUS

Jerome H. Lemelson, 85 Rector St., Metuchen, N.J. 08840

Filed Nov. 14, 1974, Ser. No. 523,864
Int. Cl.² G11B *23/04, 15/68*
U.S. Cl. 360—94 **8 Claims**



1. An apparatus for transducing information with respect to magnetic tape contained within a plurality of magazines defined by respective substantially rectangular containers of different configurations including a first container the dimensions of which are smaller than those of a second container and wherein each container has openings along an edge wall thereof to permit access to the tape therein, comprising:

a support including a housing,

magnetic transducing means movably supported by said support,

said support having an upwardly facing wall portion and first means supported by said wall portion for retaining when abutted thereagainst each magnetic tape magazine with its wall containing said openings positioned at an operative location on said housing,

second retaining means movably supported by said support and means for moving said second retaining means from a retracted position whereby it is below the upper surface of said upwardly facing wall portion of said housing and out of the way of a magazine disposed on said upwardly facing wall portion to a position whereby a portion of said second retaining means protrudes beyond said upper surface and serves to engage and cooperate with said first retaining means in predeterminately locating and retaining said first magazine in its operative location on said upwardly facing wall portion during a transducing operation,

third retaining means supported by said support for abutting and retaining a portion of the wall of the larger of said magazines so as to cooperate with said first retaining means in predeterminately locating said larger magazine on said support, and means for moving said transducing means from a first position wherein it is out of contact with the magnetic tape of a magazine disposed at said operative location to a second positioned wherein said transducing means engages said magnetic tape through an opening along said edge wall thereof.

4,008,491

FIXED HEAD, DIRECT ACCESS STORAGE DEVICE

John J. Lynott, Los Gatos, and Elwood H. Storm, Aptos, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

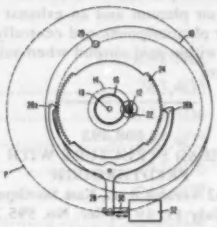
Filed Jan. 2, 1975, Ser. No. 538,090
Int. Cl.² G11B *5/82, 19/00, 25/04*
U.S. Cl. 360—97 **13 Claims**

1. A disk drive comprising at least one stationary magnetic transducer for transducing signals between external circuitry and any of a plurality of concentric tracks on a magnetic record disk;

a rotary spindle on which such a magnetic record disk may be seated for rotation;

a drive motor having a drive shaft parallel to but offset from said spindle;

coupling means for coupling said drive shaft to rotate said spindle;



escapement means for controlling stepping of said spindle to any one of a plurality of preselected positions on a path circumscribing the axis of said drive shaft,

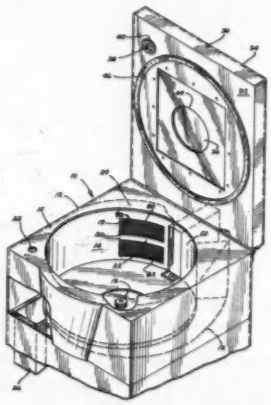
said magnetic transducer being located outside said circumscribing path of said spindle so that, when such a disk is seated on said spindle, positioning of said spindle at different preselected positions brings different concentric tracks on the disk under said magnetic transducer.

4,008,492

THERMALLY STABILIZED ENCLOSURE FOR MAGNETIC DISK

John W. Elsing, Edina, Minn., assignor to Control Data Corporation, Minneapolis, Minn.

Filed July 23, 1975, Ser. No. 598,517
Int. Cl.² G11B *17/00, 23/02*
U.S. Cl. 360—98 **6 Claims**



1. An enclosure in a magnetic memory storage device of the type using magnetic disks as the storage element comprising:

a shroud having a generally circular outer wall for enclosing the magnetic disk pack and having a spindle for mounting said pack on a bottom surface of said shroud and having a clean air inlet port an exhaust air port and an opening for head arm assemblies associated with said storage device, the air inlet port being located just downwind of said opening and the exhaust port just upwind of said opening, where upwind and downwind refer to the air circulation caused by the rotating disk pack when in operation

a clean air plenum having a clean air inlet duct and an upper surface having a small air outlet port of a predetermined size therewithin and means communicating with said air inlet port for allowing air to flow there through

air inlet means for supplying fresh air around said spindle at the bottom surface of said shroud

a top cover for said enclosure for sealing said shroud when in operation and having a circulating air plenum therewithin having an inlet port to said plenum positioned to meet in the closed position with said small air outlet port in said clean air plenum and an exhaust port from said circulating air plenum positioned centrally over said disk pack spindle within said shroud when said cover is in a closed position.

4,008,493

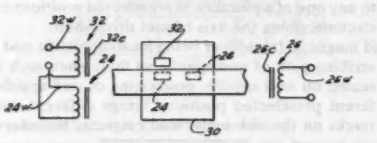
MAGNETIC HEAD STRUCTURE WITH MINIMUM FEEDTHROUGH

John N. Pizzuto, 52 Verleye Ave., East Northport, N.Y. 11731

Filed July 11, 1975, Ser. No. 595,293

Int. Cl.[2] G11B 5/20, 5/44

U.S. Cl. 360—124 5 Claims



1. A magnetic head structure comprising first and second magnetic transducers each having a core with a winding disposed about the core, said first and second magnetic transducers being positioned for cooperation with a first channel of a magnetic medium and displaced from each other along said first channel, said first magnetic transducer being adapted to record signals on the first channel of the magnetic medium, said second magnetic transducer being adapted to reproduce signals previously recorded on the first channel of the magnetic medium by said first magnetic transducer, a third magnetic transducer similar to said first magnetic transducer, a fourth magnetic transducer similar to said second magnetic transducer, said third and fourth magnetic transducers being adjacent and laterally disposed to said first and second magnetic transducers, respectively, and positioned to cooperate with a second channel of the magnetic medium and displaced from each other along said second channel, said third magnetic transducer being adapted to record signals on the second channel of the magnetic medium, said fourth magnetic transducer being adapted to reproduce signals previously recorded on the second channel of the magnetic medium by said third magnetic transducer, a neutralizing magnetic transducer having first and second windings, said neutralizing magnetic transducer being laterally disposed with respect to said first or second magnetic transducer on the side thereof remote from the second channel, means for connecting said first winding of said neutralizing magnetic transducer in a common circuit but in phase opposition with the winding of said one of said first and second magnetic transducers and means for connecting said second winding of said neutralizing magnetic transducer in a common circuit but in phase opposition with the winding of the one of said third and fourth magnetic transducers which is adjacent the one of said first and second magnetic transducers laterally disposed to said neutralizing magnetic transducer.

DESIGN PATENTS

GRANTED FEBRUARY 15, 1977

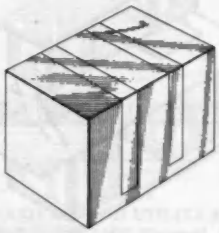
ERRATA

For CLASS	See PATENT NO.
013–029	243,403
013–013	243,404
013–013	243,405
013–013	243,406
013–013	243,407
013–003	243,408
014–070	243,409
024–008	243,412
028–013	243,418
028–048	243,419
028–047	243,420

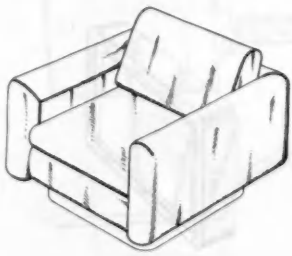
DESIGNS

FEBRUARY 15, 1977

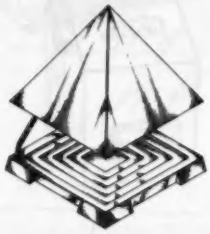
243,371
INVERTIBLE TABLE UNIT
Marilyn M. Abrams, 3440 Beret Lane, Silver Spring, Md. 20906
Filed July 7, 1975, Ser. No. 593,254
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—3



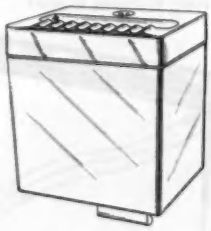
243,372
CHAIR
Robert J. Denny, 56 High St., Gardner, Mass. 01440, and Richard D. Horowitz, 180 Beacon St., Boston, Mass. 02116
Filed June 2, 1975, Ser. No. 582,581
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—26



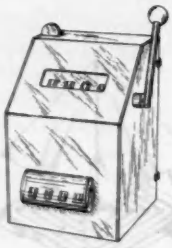
243,373
DISPLAY STAND
Marian E. Garsen, 14646 Dickens St., Sherman Oaks, Calif. 91403
Filed Feb. 3, 1976, Ser. No. 655,008
Term of patent 3½ years
Int. Cl. D20—*02*
U.S. Cl. D6—85



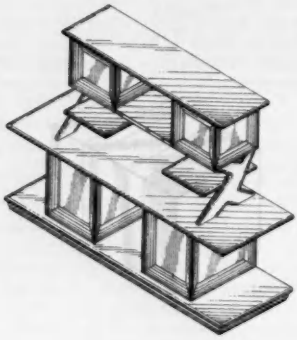
243,374
SOAP DISPENSER
Antonio Macchi Cassia, Milan, Italy, assignor to Steiner American Corporation
Filed Dec. 22, 1975, Ser. No. 642,653
Claims priority, application Italy, Aug. 8, 1975, 22091/75
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D6—95



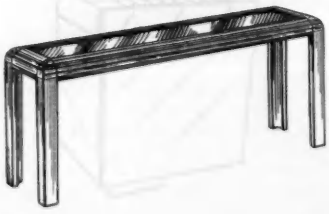
243,375
JEWELRY DISPLAY CABINET
Russell A. DiOrio, Cranston, R.I., assignor to DiOrio Enterprises, Inc.
Filed May 10, 1976, Ser. No. 685,090
Term of patent 14 years
Int. Cl. D20—*02*; D6—*04*
U.S. Cl. D6—151



243,377
COMBINED SHELF AND MULTIPLE CABINET UNIT
Ronald M. Moore, 16500 Quarry Road, Bldg. 12, Apt. 428, Southgate, Mich. 48195
Filed June 2, 1975, Ser. No. 582,847
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—186

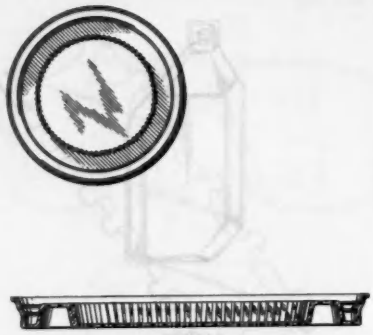


243,376
TABLE
Rupert A. Scott, Van Nuys, Calif., assignor to Rowe Furniture Corporation
Filed July 11, 1975, Ser. No. 594,941
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—175

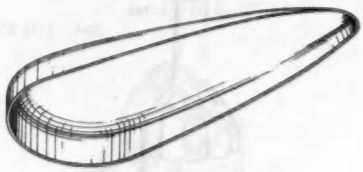


243,378
PICTURE FRAME
Gary Lee Tharp, 20851 Assiniboine Trail, Los Gatos, Calif. 95030
Filed Oct. 3, 1974, Ser. No. 511,805
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D6—242

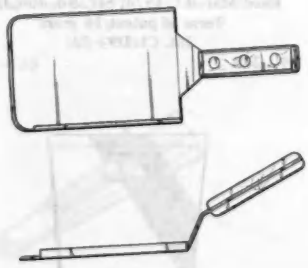
243,379
HOT CUP COASTER AND LID
Emett O. Meeks, P.O. Box 10493, Midwest City, Okla. 73110
Filed Mar. 17, 1975, Ser. No. 559,344
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—45



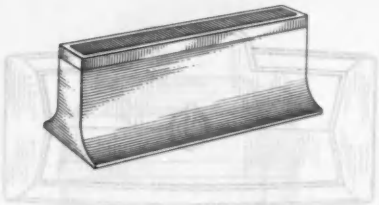
243,380
COOKING AND UTILITY PAN
Leon H. Berger, P.O. Box 1505, Flagstaff, Ariz. 86001
Filed June 19, 1975, Ser. No. 588,335
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—85

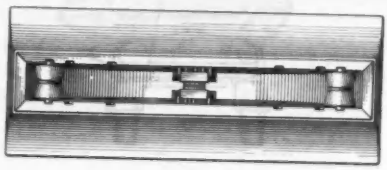


243,381
SPATULA
Thomas A. Kridos, 1821 N. Dixie Highway, Fort Lauderdale, Fla. 33305
Filed July 7, 1975, Ser. No. 593,676
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—102

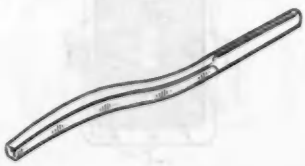


243,382
RECORD WASHER OR SIMILAR ARTICLE
Dana W. Mox, Glenview; Charles M. Smith, Palatine, and Craig J. Hudson, Crystal Lake, all of Ill., assignors to Fidelitone, Inc.
Filed Aug. 18, 1975, Ser. No. 605,622
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—161

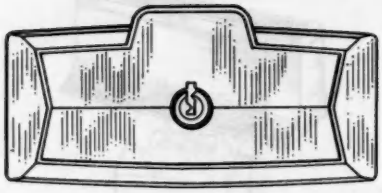


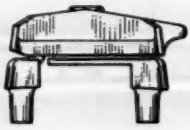


243,383
BOTTLE SCRAPER
Norman J. Płoszaj, 2066 Andover Lane, Erie, Pa. 16509
Filed May 4, 1976, Ser. No. 682,953
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—181



243,384
COMBINED DRAW BOLT AND LOCK FOR LUGGAGE OR THE LIKE
Edward M. Stolarz, Yorktown Heights, N.Y., assignor to Presto Lock Company, Division of Walter Kidde & Company, Inc., Elmwood Park, N.J.
Filed Jan. 7, 1975, Ser. No. 539,077
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—338





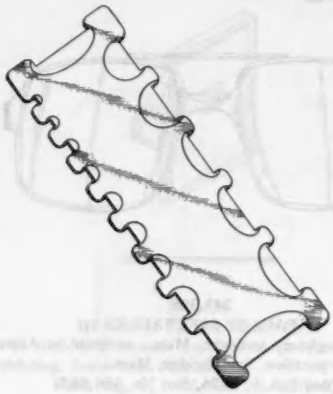
243,385
WALL PLATE
Joan Grieb, New York, N.Y., assignor to General Electric Company, New York, N.Y.
Filed Oct. 20, 1975, Ser. No. 624,033
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—351

243,386
DISPENSING CONTAINER
Earl Hoyt, Ramsey, N.J., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.
Filed June 11, 1975, Ser. No. 585,846
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—71

243,387
CARAFE
Roger de Jouennes, Rue du Bourg Bassot, 71560 - Mercurey, France
Filed June 10, 1974, Ser. No. 477,856
Claims priority, application France, Apr. 18, 1974, 74.66
Term of patent 7 years
Int. Cl. D9—*01*
U.S. Cl. D9—148

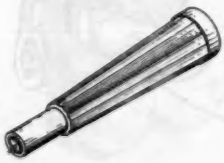
243,388
CONTAINER FOR NEWSPAPERS OR THE LIKE
Sarah J. Dumas, 300 Brentwood Drive, N.E., Altanta, Ga. 30305
Filed Mar. 12, 1974, Ser. No. 450,326
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—240

243,389
PLASTIC BINDING SIZE SELECTOR
John W. Lyon, 309 Chapel Hill Road, Hot Springs, Ark. 71901
Filed Aug. 28, 1975, Ser. No. 608,589
Term of patent 7 years
Int. Cl. D10—*04*
U.S. Cl. D10—64

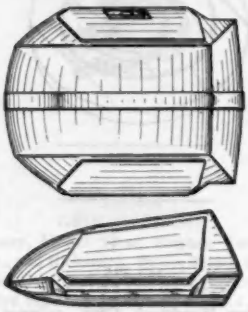


243,390
PLANTER
Lena Mastrianni, 86 Cornell Drive, Smithtown, N.Y. 11787
Filed Apr. 12, 1976, Ser. No. 675,901
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—149

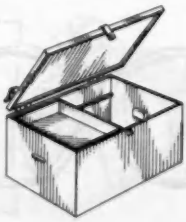
243,391
TIRE VALVE EXTENDER
Harald Schmidt, Kings Park, N.Y., assignor to Hansa Plastics, Inc., Kings Park, N.Y.
Filed Nov. 24, 1975, Ser. No. 634,446
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—153



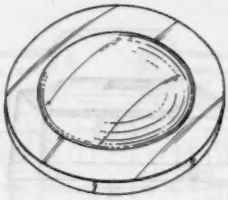
243,392
CAR TOP CARRIER
Victor Fairthorne, Toronto, Canada, assignor to Land Ranger Manufacturing Inc.
Filed Oct. 3, 1975, Ser. No. 619,375
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—157



243,393
TRUCK BED REMOVABLY MOUNTABLE UTILITY STORAGE CARRYALL
Freddie L. Wynn, 927 J S. 9th Ave., Apt. 96, Phoenix, Ariz. 85007
Filed Dec. 1, 1975, Ser. No. 636,690
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—157

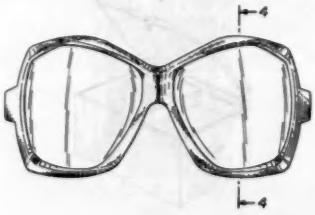


243,394
OVAL LENTICULAR LENS
Frank O. Nerad, Burbank, and Forbes C. Robertson, Woodland Hills, both of Calif., assignors to Armorlite Inc., San Marcos, Calif.
Filed May 12, 1975, Ser. No. 576,867
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—51



243,395
PAIR OF SPECTACLES
David W. Johnsen, Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.
Filed Oct. 28, 1975, Ser. No. 625,982
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65

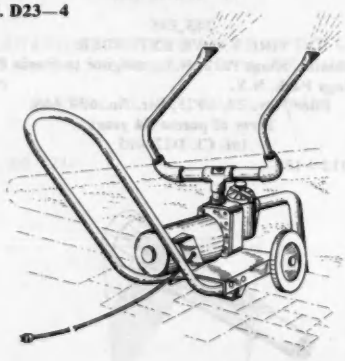
243,396
PAIR OF SPECTACLES
David W. Johnsen, Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.
Filed Dec. 8, 1975, Ser. No. 638,485
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65



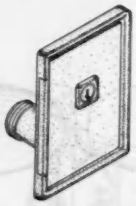
243,397
SPECTACLE FRAME FRONT
David W. Johnsen, Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.
Continuation of Ser. No. 601,853, Aug. 4, 1975. This application Jan. 8, 1976, Ser. No. 647,531
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65

243,398
PAIR OF SPECTACLES
Larry G. Loughner, Andover, Mass., assignor to American Optical Corporation, Southbridge, Mass.
Filed Feb. 9, 1976, Ser. No. 656,562
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—65

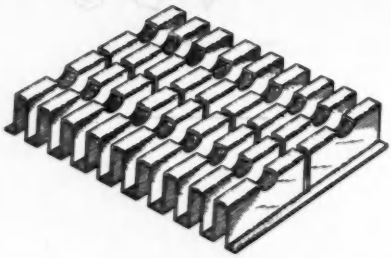
243,399
COMBINED FILTER, AERATOR AND SPRAY COOLING UNIT FOR SWIMMING POOLS
William G. Lupton, 311 Forest Drive, South, Short Hills, N.J. 07078
Filed Jan. 7, 1975, Ser. No. 539,108
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—4



243,400
WATER FILLER FITTING
Martin O. Riley, 1330 Hillcrest Ave., Pasadena, Calif. 91106
Filed Oct. 16, 1975, Ser. No. 622,987
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—40



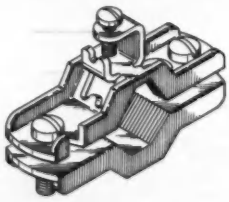
243,401
HEATING PANEL ELEMENT
Rune G. Almén, Halmstad, Sweden, assignor to Sensotherm Aktiebolag, Sandviken, Sweden
Filed Aug. 1, 1975, Ser. No. 601,163
Claims priority, application Sweden, Feb. 4, 1975, 75258
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—127



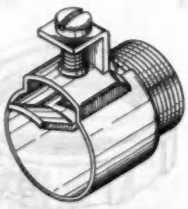
243,402
AIR FRESHENER HOUSING
Leonard A. Irving, 1801 Byrd St., Baltimore, Md. 21230
Filed Mar. 23, 1976, Ser. No. 669,482
Term of patent 3.5 years
Int. Cl. D23—*04*
U.S. Cl. D23—150

243,403
ELECTRICAL OUTLET ADAPTER
Lawrence Bernard Rellis, 2209 W. Villa Maria Drive, Phoenix, Ariz. 85023
Filed June 2, 1975, Ser. No. 582,907
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—29

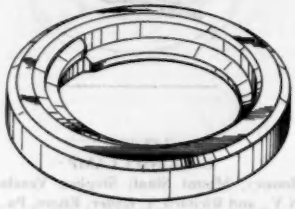
243,404
GROUND CLAMP
Thomas Mooney, Mount Sinai; Stephen Veselaski, Shirley, both of N.Y., and Richard A. Bauer, Etters, Pa., assignors to ITE Imperial Corporation, East Farmingdale, N.Y.
Filed Sept. 17, 1975, Ser. No. 614,200
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—13



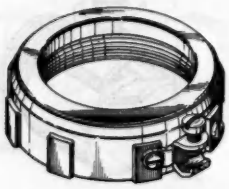
243,405
SADDLE TYPE CONNECTOR
Thomas Mooney, Mount Sinai, and Stephen Veselaski, Shirley, both of N.Y., assignors to ITE Imperial Corporation, East Farmingdale, N.Y.
Filed Sept. 17, 1975, Ser. No. 614,201
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—13



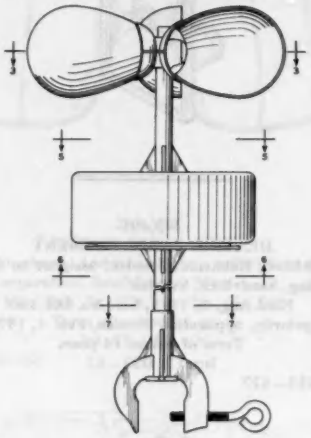
243,406
THREADED SEALING RING FOR ELECTRICAL CONNECTORS
Thomas Mooney, Mount Sinai, N.Y., and Richard A. Bauer, Etters, Pa., assignors to ITE Imperial Corporation, East Farmingdale, N.Y.
Filed Sept. 17, 1975, Ser. No. 614,233
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—13



243,407
CRADLE TYPE GROUND LUG FOR CONDUIT
Thomas Mooney, Mount Sinai, N.Y., and Richard A. Bauer, Etters, Pa., assignors to ITE Imperial Corporation, East Farmingdale, N.Y.
Filed Sept. 22, 1975, Ser. No. 615,307
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—13



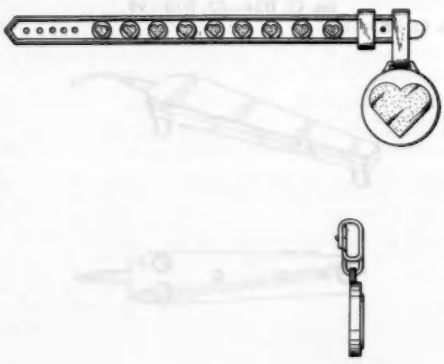
243,408
WIND DRIVEN ELECTRIC GENERATOR
Jack G. McAllister, 2701 N. Douglas Drive, Minneapolis, Minn. 55422
Filed July 2, 1975, Ser. No. 592,617
Term of patent 14 years
Int. Cl. D13—*01*
U.S. Cl. D13—3



243,409
RADIO PAGER APPARATUS OR SIMILAR ARTICLE
John Allie Eckmann, Pompano Beach, and Arnold Sherwin Goldman, Plantation, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.
Filed Mar. 8, 1976, Ser. No. 665,021
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—70

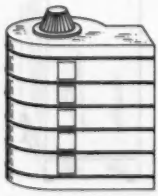
243,410
MATCH HOLDER
Linda C. Brown, 1940 Cameo, Clovis, N. Mex. 88101
Filed Aug. 15, 1975, Ser. No. 606,406
Term of patent 14 years
Int. Cl. D27—*99*
U.S. Cl. D27—32

243,411
ANIMAL COLLAR OR SIMILAR ARTICLE
Betty Lee Johnson, 7820 N. Van Ness, Fresno, Calif. 93705
Filed Sept. 10, 1974, Ser. No. 504,811
Term of patent 14 years
Int. Cl. D30—*04*
U.S. Cl. D30—38

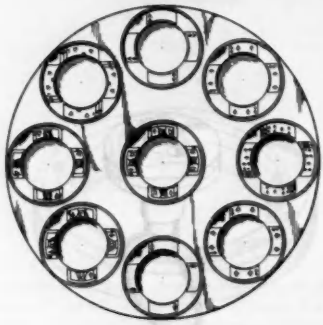


243,412
PRESSURE RELIEF VALVE FOR A LOW PRESSURE CUFFED TRACHEOSTOMY TUBE
Kenneth K. Krueger, Tustin, and Todor Pavlov, Laguna Niguel, both of Calif., assignors to Shiley Laboratories, Inc., Santa Ana, Calif.
Filed Aug. 25, 1975, Ser. No. 607,264
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D32—1 R

243,413
HORSE RACE GAME INDICATOR
Woody Savage, 114 S. 7th St., Richmond, Calif. 94801
Filed May 22, 1975, Ser. No. 579,794
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 MM

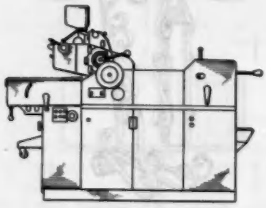


243,414
GAME TURNTABLE FOR SEGREGATING AND IDENTIFYING BY CATEGORY POKER CHIPS
Ralph G. Vyskocil, 23701 Colbourne Road, Euclid, Ohio 44123
Filed July 14, 1975, Ser. No. 595,614
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—13 A

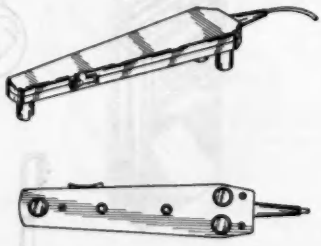


243,415
FLOOR LAMP
William A. Larson, El Cerrito, Calif., assignor to Harbor Universal, Inc.
Filed Jan. 16, 1976, Ser. No. 649,772
Term of patent 14 years
Int. Cl. D26—*03*
U.S. Cl. D48—20 A

243,416
OFFSET PRINTING PRESS MACHINE
Shigeru Shimizu, Takarazuka; Kazuyuki Hatsuda, Takatsuki, and Sadao Murata, Kyoto, all of Japan, assignors to K.K. Hamada Insatsuki Seizosho
Filed Dec. 4, 1974, Ser. No. 529,482
Claims priority, application Japan, June 8, 1974, 49-19079
Term of patent 7 years
Int. Cl. D18—*02*
U.S. Cl. D64—11 R



243,417
PHYSIOLOGICAL SENSOR
Howard Martin Allen, Beaverton, and Ronald Charles Barber, Portland, both of Oreg., assignors to Tektronix, Inc.
Filed Feb. 18, 1975, Ser. No. 550,233
Term of patent 14 years
Int. Cl. D24—*02*; D10—*99*
U.S. Cl. D83—1 F



243,418

HAND HELD ELECTRIC HAIR DRYER

Martin J. Wolff, West Haven, Conn., assignor to Sperry Rand Corporation, Bridgeport, Conn.

Filed June 4, 1975, Ser. No. 583,609

Term of patent 14 years

Int. Cl. D28—*03*

U.S. Cl. D28—13

243,419

RAZOR HANDLE

William Hedley, Gateshead, England, assignor to Wilkinson Sword Limited

Filed Mar. 27, 1975, Ser. No. 562,751

Claims priority, application United Kingdom, Oct. 8, 1974, 968237/74

Term of patent 14 years

Int. Cl. D28—*03*

U.S. Cl. D28—48

243,420

COMBINED RAZOR BLADE AND MOUNT

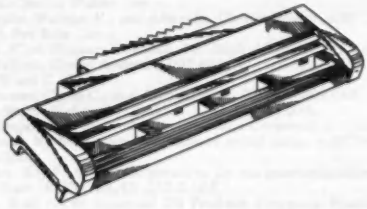
Graham R. Jones, Northumberland, England, assignor to Wilkinson Sword Limited

Filed Apr. 15, 1975, Ser. No. 568,247

Term of patent 14 years

Int. Cl. D28—*03*

U.S. Cl. D28—47



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TO WHOM

PATENTS WERE ISSUED ON THE 15TH DAY OF FEBRUARY, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

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Abe, Toshizo; Sakamoto, Seiho; Nishihara, Yasuhiro; and Saruwatari, Hidetoshi, to Mitsubishi Chemical Industries Ltd. Process for polymerizing olefin. 4,008,358, Cl. 526-116.000.

Abex Corporation: *See—*
Shaw, Edwin L., 4,008,004.

Achelpohl, Fritz, to Windmoller & Holscher. Apparatus for reversing the running direction of tube sections in sack machines. 4,007,669, Cl. 93-8.00R.

Acheson, Richard M.; Stubbs, John K.; Baxter, Charles A. R.; and Kuhla, Donald E., to Pfizer Inc. Imidazo[2,1-b]thiazole and thiazolo[3,2-a]-benzimidazole quaternary salts as hypoglycemic agents and growth promotants. 4,008,245, Cl. 260-306.70T.

Acre, Leon R., to Midland-Ross Corporation. Releasable lock for brakes. 4,007,815, Cl. 188-265.000.

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Agnelli, Joseph F., to Raymond Lee Organization, Inc., The. Garment fastener. 4,007,515, Cl. 24-103.000.

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Ahle, James L., to Gulf Research & Development Company. Synergistic weed control composition. 4,008,069, Cl. 71-90.000.

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Boron, Joseph J., 4,007,640.

Airhart, Tom Patterson, to Atlantic Richfield Company. Expanding detonation chamber multi-shot gas exploder. 4,007,803, Cl. 181-117.000.

Aisin Seiki Kabushiki Kaisha: *See—*
Kagata, Tooru, 4,007,820.

Ajax Machine and Welding Company: *See—*
Casad, Edward F.; and Jones, Richard E., 4,007,945.

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Akashi, Hiroyuki: *See—*
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Akerman, Emanuel; and Pomper, Seymour, to Standard Brands Incorporated. Method of treating baker's yeast. 4,008,335, Cl. 426-62.000.

Aki, Osami: *See—*
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Akita, Eiichi; Tsuchiya, Tsutomu; Kondo, Shinichi; Yasuda, Shuntaro; Umezawa, Sumio; and Umezawa, Hamao, to Meiji Seiki Kaisha, Ltd. 1-N-((S)-α-substituted-ω-aminoacyl)-neamine or -ribostamycin and the production thereof. 4,008,218, Cl. 536-17.000.

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Akzona Incorporated: *See—*
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Rice, Charles M., 4,007,519.

Alban, William R. Fuel rate monitor apparatus for vehicles. 4,007,634, Cl. 73-114.000.

Albano, John V.; and Smith, Donald F., to St. Regis Paper Company. Insulated container. 4,007,670, Cl. 93-36.010.

Albee, William H.: *See—*
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Clemmer, Clyde C.; and Alcorn, Ward C., III, 4,008,049.

Aldrich, Ward. Nail puller. 4,007,913, Cl. 254-18.000.

Aleck, Benjamin J., to Grumman Aerospace Corporation. Cylindrical containers by hour glass formation of metal tubes. 4,007,616, Cl. 72-38.000.

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Alkasab, Kalil A., to Universal Oil Products Company. Heating and cooling system utilizing solar energy. 4,007,776, Cl. 165-18.000.

Allan, Barry D., to United States of America, Army. Dry water. 4,008,170, Cl. 252-194.000.

Allen, Joseph C.; Woodward, Charles D.; Brown, Alfred; and Wu, Ching H., to Texaco Inc. Heated multiple solvent method for recovering viscous petroleum. 4,007,785, Cl. 166-263.000.

Allied Chemical Corporation: *See—*
Stephenson, Robert Larry; Loomba, Yogendra Singh; and Fox, William Robert, 4,007,948.

Allis-Chalmers Corporation: *See—*
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Amana Refrigeration, Inc.: *See—*
Maxwell, Richard D.; Pink, John J.; Fitzharris, Michael J.; and Marz, Louis R., 4,007,602.

Amancharla, Amareswar; and Young, Carter R., to Otis Engineering Corporation. Well plug with anchor means. 4,007,783, Cl. 166-135.000.

Amax Inc.: *See—*
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Amberg, Stephen W.; and Landers, Frank S., to Owens-Illinois, Inc. Receptacle of foamed plastic lined with unoriented polyolefin film. 4,008,347, Cl. 428-35.000.

Ambitex Corporation: *See—*
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American Color & Chemical Corporation: *See—*
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American Hospital Supply Corporation: *See—*
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Ames, Adolf; and Wagner, Alfred, to Swiss Aluminium Ltd. Container for an extrusion press. 4,007,619, Cl. 72-272.000.
AMP Incorporated: *See—*
Tucci, John James, 4,007,534.
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Anaconda Company, The: *See—*
Kuhn, Martin C.; Stephens, John A.; Noakes, Michael J.; and Rovig, Allen D., 4,008,072.
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Aono, Masazumi; Shindo, Shuichi; and Miyazako, Takushi, to Fuji Photo Film Co., Ltd. Photographic light-sensitive material. 4,008,087, Cl. 96-69.000.
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Bass, Robert J.; Koch, Richard C.; Richards, Hugh C.; and Thorpe, John E., to Pfizer Inc. Control of rice blast disease employing certain pyrido compounds. 4,008,325, Cl. 424-258.000.

Bassett, Gordon H.: *See—*
Marchello, Maurice J.; and Bassett, Gordon H., 4,007,571.

Bauer, Dan O.; and Salemka, Robert M., to Pneumo Corporation. Servoactuator. 4,007,666, Cl. 91-446.000.

Bauerle, Gerhard, to Bunker Ramo Corporation. Electrical connector. 4,007,977, Cl. 339-217.00S.

Bax, Ronald F.: *See—*
McDevitt, Howard I., Jr.; Bax, Ronald F.; and Body, Richard H., 4,007,990.

Baxter, Charles A. R.: *See—*
Acheson, Richard M.; Stubbs, John K.; Baxter, Charles A. R.; and Kuhla, Donald E., 4,008,245.

Baxter Laboratories, Inc.: *See—*
Miller, Jimmy L.; and Schnell, William J., 4,008,157.

Bayer Aktiengesellschaft: *See—*
Claussen, Uwe, 4,008,248.
Kramb, Hans, 4,008,215.
Machatzke, Heinz, 4,008,222.
Siegle, Peter; Kuhle, Engelbert; Hammann, Ingeborg; Behrenz, Wolfgang; and Homeyer, Bernhard, 4,008,328.
Sommer, Richard; and Wolfrum, Gerhard, 4,008,216.

Bayles, John H.; and Roster, Theodore J., to United States of America, Navy. Portable salvage lift apparatus. 4,007,816, Cl. 188-290.000.

Bayless, John R., to Hughes Aircraft Company. Compact high voltage feedthrough for gas discharge devices. 4,008,413, Cl. 313-331.000.

Baylor, John M., to J. I. Case Company. Sealed track joint. 4,007,972, Cl. 305-11.000.

Bea, Karl J. Wind powered fluid compressor. 4,008,006, Cl. 417-271.000.

Beall, George H.; and Rittler, Hermann L., to Corning Glass Works. High durability, reinforcing fibers for cementitious materials. 4,008,094, Cl. 106-99.000.

Beaucamp, Klaus: *See—*
Gruber, Wolfgang; Bergmeyer, Hans Ulrich; Nelboeck-Hochstetter, Michael; Beaucamp, Klaus; Holz, Gunter; Gramsall, Johanna; and Lang, Gunter, 4,008,127.

Beaugrand, Eugene L. Safety closure for medicine bottles and the like. 4,007,850, Cl. 215-216.000.

Beck, Christian A.; and Hubbard, David W., to Pitney-Bowes, Inc. Method and apparatus for handling a belt of photoconductive material. 4,007,984, Cl. 355-16.000.

Beck, Maurice Sidney; and Henry, Robert Malcolm, to National Research Development Corporation. Flow control system. 4,007,754, Cl. 137-2.000.

Beckman, John Heller, to Union Carbide Corporation. Prepackaged shirred tubular casing article. 4,007,761, Cl. 138-103.000.

Beffa, Fabio: *See—*
Lienhard, Paul; Beffa, Fabio; and Soiron, Charles, 4,008,211.

Behrenz, Wolfgang: *See—*
Siegle, Peter; Kuhle, Engelbert; Hammann, Ingeborg; Behrenz, Wolfgang; and Homeyer, Bernhard, 4,008,328.

Bell & Howell Company: *See—*
Butler, Glenn A.; and McKinley, George, 4,007,547.
Gilsdorf, Richard C.; and Browder, Lewis B., 4,008,489.

Bell, Malcolm R.; and Oesterlin, Rudolf, to Sterling Drug Inc. Cyclopenta[c]pyrrole derivatives. 4,008,250, Cl. 260-326.270.

Bell Telephone Laboratories, Incorporated: *See—*
Cohen, Richard Lewis; and Meek, Ronald Lee, 4,008,343.
Dybwad, Gay Leon, 4,008,117.
Flanagan, James Loton; MacLean, Donald John, Jr.; and West, James Edward, 4,008,376.
Runge, Peter Klaus, 4,008,390.
Schroeder, Manfred Robert, 4,008,439.

Bellows, Paul M. Shut off and venting system for a conduit transfer line. 4,007,765, Cl. 141-59.000.

Berge, Louis J.: *See—*
Carles, Jacques E.; and Berge, Louis J., 4,008,120.

Bergendorff, Fred R. Straightedge. 4,007,542, Cl. 33-77.000.

Berger, Robert E., to Goodyear Aerospace Corporation. Carbon brake disk with cast keyslot reinforcement members. 4,007,814, Cl. 188-218.0XL.

Bergmeyer, Hans Ulrich: *See—*
Gruber, Wolfgang; Bergmeyer, Hans Ulrich; Nelboeck-Hochstetter, Michael; Beaucamp, Klaus; Holz, Gunter; Gramsall, Johanna; and Lang, Gunter, 4,008,127.

Bernhardt, Frederick William. Cartridges containing self-setting mixes. 4,007,831, Cl. 206-219.000.

Bernstein, Seymour: *See—*
Conrow, Ransom Brown; Bernstein, Seymour; and Lenhard, Robert Herman, 4,008,320.

Berthiaume, Camille J., to Columbia Technical Corporation. Fuel conditioning apparatus and method. 4,008,038, Cl. 431-11.000.

Berthold, Erich: *See—*
Kurth, Harald; Laube, Dieter; and Berthold, Erich, 4,007,608.

Beschoner, Hans-Hermann; Dulken, Hartmut; Guder, Gottfried; and Kassel, Karl-Heinz, to Licentia Patent-Verwaltungs-G.m.b.H. Method for producing an electrophotographic recording material. 4,008,082, Cl. 96-1.500.

Besik, Ferdinand, to Ontario Research Foundation. Renovation of waste water. 4,008,159, Cl. 210-7.000.

Betz, Erwin C. Apparatus for combining oxygen and hydrogen. 4,008,050, Cl. 23-288.00R.

Bianco, Archangel J. B-X cable pliers. 4,007,523, Cl. 30-90.200.

Bickar, Raymond E.: *See—*
Norcia, John A.; and Bickar, Raymond E., 4,007,949.

Bigelow, Floyd E., Jr. Building system. 4,007,833, Cl. 206-321.000.

Birchall, James Derek; and Cassidy, John Edward. Method of making a fibre of aluminium phosphate. 4,008,299, Cl. 264-63.000.

Bird, Brian Michael, to National Research Development Corporation. Methods and apparatus for speed-control of induction motors. 4,008,421, Cl. 318-171.000.

Bitterli, Peter; and Kehrer, Fritz, to Sandoz Ltd. Co-condensate mixtures of iminoisoindolinones. 4,008,097, Cl. 106-288.00Q.

Black Clawson Company, The: *See—*
Erdody, Robert G.; Harmon, Paul E.; and Tetro, Richard S., 4,007,656.

Bladow, Arnold A.; and Ramsey, Francis E., to Swift and Company Limited. Method of injecting poultry in the thigh and leg portions without penetrating the skin. 4,008,337, Cl. 426-281.000.

Blake, Larry W., to American Hospital Supply Corporation. Opening mechanism for umbrella-like intravascular shunt defect closure device. 4,007,743, Cl. 128-334.00R.

Blasiole, George A.; and Carroll, Alexander A., to Carrier Corporation. Blade assembly. 4,007,998, Cl. 416-135.000.

Blay, Jorge A., to Celanese Corporation. Process for dehalogenation and/or prevention of halogenation. 4,008,279, Cl. 260-601.00R.

Blezard, Robert C., to Smithfield Fibers, Inc. Yarn and method knitting same. 4,007,611, Cl. 66-195.000.

Blum, Rudolf, to Robert Bosch G.m.b.H. Automotive test apparatus for coupling to the ignition system of automotive internal combustion engines. 4,008,430, Cl. 324-15.000.

Bockrath, Ronald E.: *See—*
Chipman, Gary R.; and Bockrath, Ronald E., 4,008,206.

Body, Richard H.: *See—*
McDevitt, Howard I., Jr.; Bax, Ronald F.; and Body, Richard H., 4,007,990.

Boehringer Mannheim G.m.b.H.: *See—*
Gruber, Wolfgang; Bergmeyer, Hans Ulrich; Nelboeck-Hochstetter, Michael; Beaucamp, Klaus; Holz, Gunter; Gramsall, Johanna; and Lang, Gunter, 4,008,127.

Boeing Company, The: *See—*
Bremer, Allen Robert; and De Vlieg, Garrett Howard, 4,007,890.
Hartel, Erwin H., 4,007,894.
Romero, Ervin Gordon, 4,007,970.

Boldrini, Walter: *See—*
Tomiati, Umberto; and Boldrini, Walter, 4,007,857.

Bolger, John G., Jr. Roadway for supplying power to vehicles and method of using the same. 4,007,817, Cl. 191-10.000.

Boliden Aktiebolag: *See—*
Petersson, Stig Arvid, 4,008,075.

Bompani, Gian Battista, to Honeywell Information Systems Italia. Bidirectional speed control system. 4,008,424, Cl. 318-293.000.

Bonnell, Robert Peter; and Northey, Arthur Douglas, to Fairey Norbon Pty. Ltd. Rotary engines, compressors and vacuum pumps. 4,007,715, Cl. 123-8.430.

Bookout, Charles C., to Ford Motor Company. Five-speed automatic transmission. 4,007,648, Cl. 74-763.000.

Boone, Henry S. Turbine engine and pump. 4,007,996, Cl. 415-120.000.

Boop, Gene T. Explosively actuated well tool having improved disarmed configuration. 4,007,796, Cl. 175-4.550.

Boord, Leslie F.: *See—*
Gray, Robert E.; and Boord, Leslie F., 4,007,758.

Borgersen, Egil, to Nordisk Kartro Aktiebolag. Fastener package. 4,007,834, Cl. 206-338.000.

Boron, Joseph J., to Aikoh Co., Ltd. Sampling apparatus. 4,007,640, Cl. 73-425.40R.

Borrini, Bartolomeo: *See—*
Fedrigo, Renzo; Borrini, Bartolomeo; Garattini, Vittorio; and Pino, Giovanni, 4,008,021.

Borstel, Eugene C., Jr., to Omark Industries, Inc. Mower. 4,007,578, Cl. 56-295.000.

Bosch-Siemens Hausgerate GmbH: *See—*
Ballarin, Jurgen, 4,007,604.

Boudakian, Max M., to Olin Corporation. Preparation of 2-amino-5-halobenzotrifluoride. 4,008,278, Cl. 260-578.000.

Bourke, Robert F.: *See—*
Christianson, Clinton C.; and Bourke, Robert F., 4,008,423.

Bowers, John Edwin, to International Lead Zinc Research Organization, Inc. Superconducting alloys. 4,008,079, Cl. 75-134.00T.

Bowling, Teamus, to General Electric Company. Differential expansion rod and tube thermostat. 4,008,454, Cl. 337-386.000.

Bowman, Ronald R.: *See—*
Babij, Tadeusz M.; Bowman, Ronald R.; and Wacker, Paul F., 4,008,477.

BP Chemicals International Limited: *See*—
Gasson, Edward James; Krosnar, Thomas Charles, deceased; and Marrian, Stanley Frederic, 4,008,179.

Bracher, Daniel; and Lotmar, Walter. Device for the measurement of the size of an eye pupil. 4,007,980, Cl. 351-6.000.

Braemar Computer Devices, Inc.: *See*—
Osborne, George T., 4,008,488.

Braguier, Michel Arsene: *See*—
Aubin, Gerard; Braguier, Michel Arsene; Nature!, Christian; Poulin, Etienne M.; and Wattre, Joseph A., 4,007,969.

Brandon, Ross H.; and Zeffer, Peter P., to Jervis B. Webb Company. Apparatus for stripping an anode block from an anode assembly. 4,007,533, Cl. 29-762.000.

Brandt, Paul W.; and Somerville, Dean S. Locking puller device. 4,007,535, Cl. 29-261.000.

Branson, Charles D.; and Demi, Roy C., to Robertshaw Controls Company. Fuel control system and control device therefor or the like. 4,007,760, Cl. 137-614.130.

Branson, Charles D.; and Demi, Roy C., to Robertshaw Controls Company. Fuel control system and control device therefor or the like. 4,007,872, Cl. 236-15.00A.

Branson, Charles D.; and Demi, Roy C., to Robertshaw Controls Company. Fuel control system and control device therefore or the like. 4,007,907, Cl. 251-85.000.

Brantley, Richard G.: *See*—
Waldrop, Rayburn C.; and Brantley, Richard G., 4,007,741.

Brauer, Melvin; and Kroplinski, Thaddeus Frank, to N L Industries, Inc. Mineral oil extended polyurethane system containing a coupling agent for decontaminating and sealing the interior spaces of an insulated electrical device. 4,008,197, Cl. 260-31.600.

Braukman, Eugene H.: *See*—
Vice, Lester J., 4,007,887.

Braunschweigische Maschinenbauanstalt: *See*—
Dietzel, Walter; Matusch, Siegfried; Schaper, Helmut; and Zeichner, Erwin, 4,008,098.

Braytenbah, Andrew S.; and Jaegtnes, Karl O., to Westinghouse Electric Corporation. Dual turbine power plant and a reheat steam bypass flow control system for use therein. 4,007,595, Cl. 60-644.000.

Braytenbah, Andrew S.; and Jaegtnes, Karl O., to Westinghouse Electric Corporation. Dual turbine power plant and method of operating such plant, especially one having an HTGR steam supply. 4,007,596, Cl. 60-652.000.

Braytenbah, Andrew S.: *See*—
Jaegtnes, Karl O.; and Braytenbah, Andrew S., 4,007,597.

Bremer, Allen Robert; and De Vlieg, Garrett Howard, to Boeing Company, The. Aircraft towing braking system. 4,007,890, Cl. 244-50.000.

Bremer, Klaus: *See*—
Brown, Scott L., Jr.; and Bremer, Klaus, 4,007,826.

Brenneman, Richard S.; and Clancy, John J., to Combustion Equipment Associates, Inc. Process for treating organic wastes. 4,008,053, Cl. 44-1.00D.

Brenner, Gordon M.: *See*—
Brenner, Michael G.; and Brenner, Gordon M., 4,007,898.

Brenner, Michael G.; and Brenner, Gordon M., to M.G.B., Inc. Torque collar for high torque motors. 4,007,898, Cl. 248-26.000.

Brettschneider, Johannes; Bundesen, Lorenz; and Knapp, Heinrich, to Robert Bosch G.m.b.H. Apparatus for the detoxification of exhaust gases. 4,007,719, Cl. 123-119.00D.

Brettschneider, Johannes; Bundesen, Lorenz; and Knapp, Heinrich, to Robert Bosch G.m.b.H. Fuel metering system for internal combustion engines. 4,007,720, Cl. 123-122.00R.

Briar, Jack E.: *See*—
Scoggin, Baxter I., Jr.; Vaughan, Woodrow E.; Reed, Gerald D.; Cartner, Don W.; Hill, David E.; and Briar, Jack E., 4,007,510.

Bricker, Daniel W.: *See*—
Murray, Donald E.; and Bricker, Daniel W., 4,008,040.

Brico Engineering Limited: *See*—
Cadle, Terence M., 4,008,051.

Briggs, George Oliver, to International Basic Economy Corporation. Method for adjusting temperature and pressure of a fluid. 4,007,545, Cl. 34-14.000.

Brimer, Claude Morris, to Linear International Corporation. Washing machine balance and suspension system. 4,007,612, Cl. 68-23.200.

British Petroleum Company Limited, The: *See*—
Park, Anthony John; and Weeks, Brian, 4,008,361.

Broadhill Development Corporation: *See*—
Carlson, Elmer T., 4,008,365.

Brockington, James W., to Texaco Inc. Alkylation catalyst for production of motor fuels. 4,008,178, Cl. 252-434.000.

Broll, Arno: *See*—
Wagner, Hans B.; and Broll, Arno, 4,008,091.

Bromfield, Ian Derek; and Seddon, Peter, to Nippon Kogaku K.K. Manufacture of multi-layer structures. 4,007,988, Cl. 355-133.000.

Bron, Dan; and Arazi, Amatzia. Fluid-operated hypodermic syringe. 4,007,739, Cl. 128-218.00R.

Brooks, Jackson R., to ABC Extrusion Company. Extruded aluminum sign frame system. 4,007,552, Cl. 40-130.00R.

Brouard, Claude Marie Henri Emile; Leroy, Jean Marie Louis; and Stiot, Jean-Pierre Henri, to Ugine Kuhlmann. Azo dyestuffs containing a cinnamonitrile residue. 4,008,213, Cl. 260-160.000.

Browder, Lewis B.: *See*—
Gilsdorf, Richard C.; and Browder, Lewis B., 4,008,489.

Brown, Alfred: *See*—
Allen, Joseph C.; Woodward, Charles D.; Brown, Alfred; and Wu, Ching H., 4,007,785.

Brown, Delmont D., to D. S. Brown Company, The. Expansion joint with elastomer seal. 4,007,994, Cl. 404-69.000.

Brown, Donald P., to United States of America, Energy Research and Development Administration. Gamma compensated, self powered neutron detector. 4,008,399, Cl. 250-390.000.

Brown, Eric D.; and Chaffee, Roger G., to Dow Corning Corporation. Method of preparing phosphonium siloxanes and products thereof. 4,008,261, Cl. 260-448.20E.

Brown, Robert L. Marine platform. 4,007,599, Cl. 61-104.000.

Brown, Scott L., Jr.; and Bremer, Klaus, to Stephens-Adamson, Inc. Dual pressure take-up apparatus and system for dual belt conveyor-elevator. 4,007,826, Cl. 198-813.000.

Brubaker, Burton D., to Dow Chemical Company, The. Structures for absorbing impact energy. 4,007,917, Cl. 256-13.100.

Brugger, Robert M.; Miller, Lowell G.; and Young, Robert C., to United States of America, Energy Research and Development Administration. Production of 14 MeV neutrons by heavy ions. 4,008,411, Cl. 313-61.00R.

Brunin, Jean-Pierre; and Thomas, Jean-Marc, to Compagnie Honeywell Bull (Societe Anonyme). Apparatus for checking the operation of control circuits. 4,008,389, Cl. 235-153.0AS.

Brunnett, Carl J.; Cox, Jerome R., Jr.; Snyder, Donald L.; and Mattson, Rodney A., to Picker Corporation. Transverse tomography system having multibeam orbital scanning with all beams offset from the center of orbit. 4,008,400, Cl. 250-445.00T.

Bryant, Louis R.; Pedersen, Raymond J.; and Weinberger, Arnold, to International Business Machines Corporation. Circuit for implementing a modified LRU replacement algorithm for a cache. 4,008,460, Cl. 340-172.500.

Buchan, W. Raymond; and Mayer, Edward F., to Itek Corporation. Xerographic development apparatus having a large reservoir for controlled flow through a narrow development zone. 4,007,707, Cl. 118-647.000.

Buerger, Herbert, to Del-Met Corporation. Lockring, trim ring and molded plastic wheel cover assembly. 4,007,967, Cl. 301-37.00P.

Bugaut, Andree: *See*—
Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, 4,007,747.
Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, 4,008,043.
Kalopissis, Gregoire; Gascon, Jean; Bugaut, Andree; Gallien, Jacqueline; and Gaston-Breton, Hubert, 4,008,272.

Bundesen, Lorenz: *See*—
Brettschneider, Johannes; Bundesen, Lorenz; and Knapp, Heinrich, 4,007,719.
Brettschneider, Johannes; Bundesen, Lorenz; and Knapp, Heinrich, 4,007,720.

Bunker Ramo Corporation: *See*—
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Burch, Andrew E. Saw tables. 4,007,657, Cl. 83-471.300.

Burkhardt, Jurgen: *See*—
Krohberger, Herbert; Burkhardt, Jurgen; and Patzke, Jorg, 4,008,198.

Burroughs Corporation: *See*—
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Burzlaff, Henry A.: *See*—
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Busch, Norbert: *See*—
Mauvernay, Roland-Yves; Busch, Norbert; Moleyre, Jacques; Simons, Jacques; and Monteil, Andre, 4,008,329.

Buseth, Richard A.; and Rogers, Russell L., to Aeroquip Corporation. Full flow valved fitting. 4,007,909, Cl. 251-149.200.

Butler, Glenn A.; and McKinley, George, to Bell & Howell Company. Card handling teaching machine with instantaneous feedback system. 4,007,547, Cl. 35-35.00C.

Byczkowski, Mieczyslaw W., to International Rectifier Corporation. Compression-assembled semiconductor device with nesting circular flanges and flexible locating ring. 4,008,486, Cl. 357-74.000.

Cabasso, Israel: *See*—
Jagur-Grodzinski, Joseph; Vofsi, David; and Cabasso, Israel, 4,008,191.

Cadle, Terence M., to Brico Engineering Limited. Composite metal articles. 4,008,051, Cl. 29-182.300.

Cady, Percy L., to Houdaille Industries, Inc. Punching device with punch retainer. 4,007,653, Cl. 83-140.000.

Cailliot, Serge Leon Louis; and Andre, Leopold Guy Pierre. Coffee mill. 4,007,675, Cl. 99-286.000.

Caldwell, Bessie L.: *See*—
Hinchman, Leslie R.; and Hinchman, Robert B., 4,007,591.

Caldwell, Edward N., to Robertshaw Controls Company. Heat exchange system and method and control device therefor having motion feedback means. 4,007,775, Cl. 165-1.000.

Caldwell, Edward N., to Robertshaw Controls Company. Heat exchange system and method and control device therefor having motion feedback means. 4,007,778, Cl. 165-34.000.

Caldwell, Edward N., to Robertshaw Controls Company. Heat exchange system and method and control device therefor having motion feedback means. 4,007,779, Cl. 165-34.000.

Caldwell, Edward N.; and Scott, Douglas R., to Robertshaw Controls Company. Heat exchange system and method and control device therefor. 4,007,780, Cl. 165-39.000.

Callahan, William A.; Glenn, Eldridge Myles; and Rector, Douglas L., to Upjohn Company, The. Substituted ureas and thioureas and pharmaceutical compositions thereof. 4,008,326, Cl. 424-263.000.

Calvert, Rodney K., to Mead Corporation, The. Article carrier partition insert. 4,007,830, Cl. 206-175.000.

Calvin, Donald W.: *See—*
Leathers, Joel F. M.; and Calvin, Donald W., 4,008,130.
Cameron, Frank L., to Westinghouse Electric Corporation. Current limiting fuse device for relatively high current. 4,008,452, Cl. 337-284.000.
Cameron Iron Works, Inc.: *See—*
Jones, Marvin R., 4,007,904.
Campbell, Sterrett P., to Pak-It Mgf Co., Inc. Bread dough rounder bar. 4,008,025, Cl. 425-96.000.
Canada, Her Majesty The Queen in right of, as represented by the Minister of National Defense: *See—*
Smith, Donald Leslie; and Noble, Donald William, 4,007,660.
Canadian General Electric Company Limited: *See—*
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Canon Kabushiki Kaisha: *See—*
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Cape Colony Manufacturing, Inc.: *See—*
Crandall, Nelson B., 4,007,865.
Carabateas, Philip M.; and Williams, Gordon L., to Sterling Drug Inc. Preparation of 4-(3-nitrophenyl)pyridine. 4,008,239, Cl. 260-290.00P.
Carl Still, Firma: *See—*
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Carles, Jacques E.; and Berge, Louis J., to Groupement Europeen De La Cellulose. Process of delignification and bleaching a lignocellulose product. 4,008,120, Cl. 162-89.000.
Carlick, Daniel J.: *See—*
Rosen, George; Carlick, Daniel J.; and Reiter, Ralph H., 4,008,138.
Carling, Helge, to Myrens Verksted A/S. Rotary pump with pivoted flap engaging a bladed rotor. 4,008,019, Cl. 418-221.000.
Carlisle Chemical Works, Inc.: *See—*
Weisfeld, Lewis B., 4,008,201.
Carlson, Elmer T., to Broadhill Development Corporation. Bus tray electrical distribution system. 4,008,365, Cl. 174-68.00B.
Carlson, John A., to Conchemco, Incorporated. Choke control assembly. 4,007,647, Cl. 74-501.00R.
Carpenter, Richard A.: *See—*
Gelfand, Peter C.; Carpenter, Richard A.; and Shoup, Jerry F., 4,008,057.
Carrico, Philip Hugh, to General Electric Company. Thermoplastic tube seal and cooling means. 4,008,022, Cl. 425-72.00R.
Carrier Corporation: *See—*
Blasiole, George A.; and Carroll, Alexander A., 4,007,998.
Carroll, Alexander A.: *See—*
Blasiole, George A.; and Carroll, Alexander A., 4,007,998.
Carroll, Patrick J.: *See—*
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Cartner, Don W.: *See—*
Scoggin, Baxter I., Jr.; Vaughan, Woodrow E.; Reed, Gerald D.; Cartner, Don W.; Hill, David E.; and Briar, Jack E., 4,007,510.
Casad, Edward F.; and Jones, Richard E., to Ajax Machine and Welding Company. Swing-out shock absorbing hitch. 4,007,945, Cl. 280-478.00B.
Casanova, Hans H.: *See—*
Rhudy, Ralph G.; and Casanova, Hans H., 4,008,409.
Casciano, Donna R.: *See—*
Casciano, Robert M.; and Casciano, Donna R., 4,007,937.
Casciano, Robert M.; and Casciano, Donna R. Tennis game board. 4,007,937, Cl. 273-134.0CA.
Cassidy, John Edward: *See—*
Birchall, James Derek; and Cassidy, John Edward, 4,008,299.
Castell, William Gummer. Apparatus for disposal of effluents. 4,008,155, Cl. 210-242.00R.
Caterpillar Tractor Co.: *See—*
Goloff, Alexander, 4,008,016.
Peifer, Gary S.; and Shulke, David D., 4,007,958.
Staebler, Paul J., 4,008,014.
Stepe, Visvaldis A., 4,007,550.
Cave, Wilfred Johnson; and Culver, Edward George, to Hallam Polymers & Engineering Limited. Towing etc. cable protection means. 4,007,702, Cl. 114-230.000.
Cawley, William H.: *See—*
Rowe, Edward A., Jr.; and Cawley, William H., 4,008,101.
Cecil, Shelby, to Glitsch, Inc. Welding apparatus. 4,008,384, Cl. 219-125.00R.
Celanese Corporation: *See—*
Blay, Jorge A., 4,008,279.
Gall, John S., 4,008,199.
Randall, John Courtright; and Keith, Charles Herbert, 4,007,745.
Celeste, Victor; Drum, David Charles; and Nelson, Brian Joseph, to Vaxar Ltd. Posture training device. 4,007,733, Cl. 128-2.00S.
Cendev Corporation: *See—*
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Cengel, John A.: *See—*
Puskas, Imre; and Cengel, John A., 4,008,168.
Central Sprinkler Corporation: *See—*
Anderson, James R., 4,007,878.
Chaffee, Roger G.: *See—*
Brown, Eric D.; and Chaffee, Roger G., 4,008,261.
Chambers, Henry B., to Hydranautics. Jacking apparatus. 4,007,915, Cl. 254-108.000.
Chang, John Y. K.: *See—*
Lanning, George R.; and Chang, John Y. K., 4,008,470.
Chantry, Peter J.; and Chen, Cheng-Lin, to Westinghouse Electric Corporation. Electronegative gas detection technique. 4,007,624, Cl. 73-23.000.
Chao, Bei Tse; and Rabl, Ari, to United States of America, Energy Research and Development Administration. Means of increasing efficiency of CPC solar energy collector. 4,007,729, Cl. 126-271.000.
Chapa, Roman. Protected mechanical seal. 4,007,940, Cl. 277-32.000.
Chapman, Jamie C., to Terrestrial Systems, Incorporated. Signal processing in short-pulse geophysical radar system. 4,008,469, Cl. 343-5.0NA.
Chase-Shawmut Company, The: *See—*
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Chasen, Lee Richard: *See—*
Einhorn, Ruediger; Chasen, Lee Richard; and Hannes, Karl, 4,007,532.
Chastan-Bagnis, Lucien. Device for sucking the upper layer of a polluted water surface. 4,008,156, Cl. 210-242.00R.
Chauvette, Robert R., to Eli Lilly and Company. Process for preparing 3-methyl-3-cephem antibiotics. 4,008,228, Cl. 260-243.00C.
Chemie Linz Aktiengesellschaft: *See—*
Weinrotter, Ferdinand; Wegleitner, Karlheinz; and Muller, Walter, 4,008,234.
Chemincon Incorporated: *See—*
Norton, Gerard, 4,008,109.
Chen, Cheng-Lin: *See—*
Chantry, Peter J.; and Chen, Cheng-Lin, 4,007,624.
Cherednichenko, Vladimir Semenovich: *See—*
Frolov, Jury Fedorovich; Naryshkin, Jury Anatolievich; Cherednichenko, Vladimir Semenovich; Piljukov, Jury Fedorovich; Orlov, Gennady Ivanovich; Mikulinsky, Aron Semenovich; Suturin, Serafim Nikolaevich; Slobodkin, Leonid Vladimirovich; and Dashkov, Konstantin Stepanovich, 4,008,364.
Chevron Research Company: *See—*
Jacobson, Robert L.; and Gibson, Kirk R., 4,008,174.
Chia, Enrique C., to Southwire Company. Molten metal filter. 4,007,923, Cl. 266-217.000.
Chipman, Gary R.; and Bockrath, Ronald E., to Standard Oil Company (Indiana). Solid state polymerization. 4,008,206, Cl. 260-75.00M.
Chirgwin, Lester Daniel, Jr.: *See—*
Glick, Arthur; and Chirgwin, Lester Daniel, Jr., 4,008,303.
Chisholm, Douglas B. Breakaway coupling and assembly. 4,007,564, Cl. 52-98.000.
Chrisp, Joseph Dean, to Du Pont de Nemours, E. I., and Company. Formation of foamed emulsion-type blasting agents. 4,008,108, Cl. 149-2.000.
Christiansen, Paul; and Roshon, George K., to Hayes-Albion Corporation. Method and apparatus for knitting patterned sliver high pile fabric. 4,007,607, Cl. 66-9.00B.
Christianson, Clinton C.; and Bourke, Robert F., to Gould Inc. Electrically propelled vehicle. 4,008,423, Cl. 318-139.000.
CHU Associates, Inc.: *See—*
Smith, Valor Clark, 4,008,479.
Ciba-Geigy AG: *See—*
Lienhard, Paul; Beffa, Fabio; and Soiron, Charles, 4,008,211.
Ciba-Geigy Corporation: *See—*
L'Eplattenier, Francois; Vuitel, Laurent; and Pugin, Andre, 4,008,225.
Luthi, Christian, 4,008,166.
Moser, Hans, 4,008,066.
Siegrist, Adolf Emil; and Coviello, Vincenzo, 4,008,224.
von Rutte, Richard; and Gasser, Walter, 4,008,172.
Cincinnati Milacron, Inc.: *See—*
Edwards, Bobbie Lee, 4,007,679.
Citizen Watch Co., Ltd.: *See—*
Nishimura, Hajime; and Toda, Mitsuhisa, 4,008,357.
Clampitt, Richard L., to Phillips Petroleum Company. Acidizing wells. 4,007,789, Cl. 166-281.000.
Clancey, James T.; Gorin, Everett; Reichl, Eric H.; and Rice, Charles H., to Consolidation Coal Company. Process for making low-sulfur and low-ash fuels. 4,008,054, Cl. 44-10.00R.
Clancy, John J.: *See—*
Brenneman, Richard S.; and Clancy, John J., 4,008,053.
Clarkson, Curtis W., to J. R. Clarkson Company, The. Packingless gate valve and actuator assemblies. 4,007,911, Cl. 251-233.000.
Claussen, Uwe, to Bayer Aktiengesellschaft. Process for the purification of coumarins. 4,008,248, Cl. 260-308.00A.
Clegg, Kessler Q. Safety indicators for guns. 4,007,553, Cl. 42-1.00A.
Clemens, Kurt, to L. & C. Steinmuller GmbH. Method and apparatus for a differential rolling-in of tubes. 4,007,699, Cl. 113-118.00C.
Clemmer, Clyde C.; and Alcorn, Ward C., III, to Dart Industries Inc. Apparatus for controlling operational parameters in polymerization equipment. 4,008,049, Cl. 23-288.00H.
Clinton, William P.: *See—*
Kung, Jo-Fen T.; Clinton, William P.; and Soukup, Robert J., 4,008,340.
Coaltek Associates: *See—*
Auvil, Harvey S.; and Davis, Rufus F., Jr., 4,008,042.
Coats & Clark, Inc.: *See—*
Einhorn, Ruediger; Chasen, Lee Richard; and Hannes, Karl, 4,007,532.
Hannes, Karl; and Rossi, Paul C., 4,007,524.
Coblitz, David B., to McDonnell Douglas Corporation. Reflection elimination system. 4,007,979, Cl. 350-156.000.
Cohen, Richard Lewis; and Meek, Ronald Lee, to Bell Telephone Laboratories, Incorporated. Process for electroless plating using colloid sensitization and acid rinse. 4,008,343, Cl. 427-305.000.

Coleman, John Douglas, to Commonwealth Scientific and Industrial Research Organization. Method of curtain coating pigment particles on paper plies. 4,008,121, Cl. 162-124.000.

Colledge, Gary C., to Colledgewood, Ltd. Highspeed rotary branding process having increased die life. 4,007,767, Cl. 144-328.000.

Colledgewood, Ltd.: *See—*
Colledge, Gary C., 4,007,767.

Collins, Robert C.: *See—*
Kelsey, Edward A., 4,007,641.

Collins, Roger Bernard; and Key, Jonathan Anthony Henry. Fluid bearings. 4,007,973, Cl. 308-9.000.

Columbia Technical Corporation: *See—*
Berthiaume, Camille J., 4,008,038.

Combustion Equipment Associates, Inc.: *See—*
Brenneman, Richard S.; and Clancy, John J., 4,008,053.

Comez, S.p.A.: *See—*
Zorini, Luigi Omodeo, 4,007,609.

Commiant, Michel, to Compagnie Generale Belge des Isolants (COGEBI). Apparatus for washing vegetables, fruits and the like foodstuffs. 4,007,751, Cl. 134-140.000.

Commonwealth Scientific and Industrial Research Organization: *See—*
Coleman, John Douglas, 4,008,121.

Communications Satellite Corporation (COMSAT): *See—*
Lanier, Raymond H., 4,008,375.

Compagnie Generale Belge des Isolants (COGEBI): *See—*
Commiant, Michel, 4,007,751.

Compagnie Honeywell Bull (Societe Anonyme): *See—*
Brunin, Jean-Pierre; and Thomas, Jean-Marc, 4,008,389.

Compton, William A.; Duffy, Thomas E.; LeCren, Richard T.; and Shekleton, Jack R., to International Harvester Company. Low emission burners and control systems therefor. 4,008,039, Cl. 431-90.000.

Conchemco, Incorporated: *See—*
Carlson, John A., 4,007,647.

Congoleum Corporation: *See—*
Ehrenfeld, Frank E., Jr.; and Piacente, Anthony N., 4,008,349.

Conley, George R.; and Conley, Gerald F. Line securing device. 4,007,808, Cl. 182-142.000.

Conley, Gerald F.: *See—*
Conley, George R.; and Conley, Gerald F., 4,007,808.

Conrow, Ransom Brown; Bernstein, Seymour; and Lenhard, Robert Herman, to American Cyanamid Company. Amidophenyl-azo-naphthalenesulfonic complement inhibitors and method of use thereof. 4,008,320, Cl. 424-226.000.

Consolidation Coal Company: *See—*
Clancey, James T.; Gorin, Everett; Reichl, Eric H.; and Rice, Charles H., 4,008,054.

Continental Gummi-Werke Aktiengesellschaft: *See—*
Kunz, Manfred, 4,007,692.

Continental Oil Company: *See—*
Gorin, Everett, 4,008,310.

Control Data Corporation: *See—*
Elsing, John W., 4,008,492.

Cooper, Julius, to Ideal Toy Corporation. Timing game. 4,007,933, Cl. 273-86.00C.

Cooper, Wayne E.: *See—*
Wesebaum, Paul E.; and Cooper, Wayne E., 4,008,118.

Corning Glass Works: *See—*
Beall, George H.; and Rittler, Hermann L., 4,008,094.
Folmar, Robert G.; and VanDewoestine, Robert V., 4,008,033.

Cornwell, Charles E.: *See—*
Plunguian, Mark; and Cornwell, Charles E., 4,007,920.

Corson, Frederick P.: *See—*
Evani, Syamalarao; and Corson, Frederick P., 4,008,202.

Costa, Tarsis Octavio. Convertible sofa-chair. 4,007,961, Cl. 297-111.000.

Cottle, John E., to Phillips Petroleum Company. Gas recovery from hydrate reservoirs. 4,007,787, Cl. 166-267.000.

Coules, Ronald A., to Richco Plastic Company. Quarter turn locking fastener device. 4,007,516, Cl. 24-221.00R.

Cousse, Henri; Mouzin, Gilbert; Rieu, Jean-Pierre; and Delhon, Andre, to Pierre Fabre S.A. Method of reducing cholesterol using certain aromatic keto acids. 4,008,323, Cl. 424-250.000.

Coviello, Vincenzo: *See—*
Siegrist, Adolf Emil; and Coviello, Vincenzo, 4,008,224.

Cox, Jerome R., Jr.: *See—*
Brunnett, Carl J.; Cox, Jerome R., Jr.; Snyder, Donald L.; and Mattson, Rodney A., 4,008,400.

Crandall, Nelson B., to Cape Colony Manufacturing, Inc., a part interest. Web guiding and centering apparatus. 4,007,865, Cl. 226-17.000.

Crawford, George H.; and Smith, Howell K., II, to Minnesota Mining and Manufacturing Company. Visco-elastic material comprising a polymeric foam impregnated with an acrylic resin. 4,008,350, Cl. 428-311.000.

Crowley All Terrain Corporation: *See—*
Vincent, Charles R.; and Albee, William H., 4,007,801.

Crown Cork & Seal Company, Inc.: *See—*
Urban, Joseph J., 4,007,620.

Culver, Edward George: *See—*
Cave, Wilfred Johnson; and Culver, Edward George, 4,007,702.

Curtiss-Wright Corporation: *See—*
Jones, Charles, 4,007,714.

Cytanovich, Kathryn Frances. Method of teaching reading. 4,007,548, Cl. 35-35.00R.

D. S. Brown Company, The: *See—*
Brown, Delmont D., 4,007,994.

Daicel, Ltd.: *See—*
Arisaka, Katsuharu; Sawada, Hideo; and Shimoguchi, Kozo, 4,008,301.
Sawada, Hideo; and Kotani, Motoharu, 4,007,746.

Daimler-Benz Aktiengesellschaft: *See—*
Stolz, Albert; and Stehle, Axel, 4,007,875.

Dandrea, Stanley A. Auxiliary hopper apparatus for reloading press. 4,007,859, Cl. 222-443.000.

Darco Telemetering Systems: *See—*
Wensley, Gerald J., 4,008,458.

Dart Industries Inc.: *See—*
Clemmer, Clyde C.; and Alcorn, Ward C., III, 4,008,049.
Holoubek, George H., 4,007,900.
Holoubek, George H.; and Burzlaff, Henry A., 4,008,401.
Korenowski, Theodore Frank; Penland, Jerry Lee; and Ritzert, Chalmer John, 4,008,162.

Dashkov, Konstantin Stepanovich: *See—*
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Davidson, Eric, to Scottish Agricultural Industries Limited. Manufacture of solid ammonium phosphate. 4,008,314, Cl. 423-309.000.

Davis, Rufus F., Jr.: *See—*
Auvil, Harvey S.; and Davis, Rufus F., Jr., 4,008,042.

Davis, Stephen A., to Philadelphia Quartz Company. Defoamer composition. 4,008,173, Cl. 252-358.000.

Davis, Steven S., to Envirotech Corporation. Dewatering machine. 4,008,158, Cl. 210-386.000.

Davis, William R.; and Flaherty, William H., Jr., to Stanley Works, The. Pivot hung power operated door and inertia insensitive disconnectable drive linkage therefor. 4,007,557, Cl. 49-139.000.

Dawes, David Haddon; and Gupta, Kashmiri Lal, to Du Pont of Canada Limited. Heat lamination of thermoplastic films. 4,008,352, Cl. 428-474.000.

De Avila-Serafin, Antonio; and Diaz-Romo, Francisco Javier, to Electrotec de Occidente, S.A. Photocontrol for electric lamps. 4,008,415, Cl. 315-156.000.

De Beul, Victor Franciscus: *See—*
Verlinden, Victor Clement; and De Beul, Victor Franciscus, 4,008,036.

De brabandere, Luc Achiel: *See—*
Pattyn, Herman Alberik; Vanassche, Willy Joseph; and De brabandere, Luc Achiel, 4,008,089.

Decko, Gary W.: *See—*
Banthin, Clifford R.; Decko, Gary W.; and Hurley, John F., 4,007,587.

Deere & Company: *See—*
Emmert, Robert Wayne, 4,007,757.

DeFord, Donald D.: *See—*
Roof, Lewis B.; and DeFord, Donald D., 4,007,626.

Deibel, Raymond A., to Trico Products Corporation. Vehicle windshield wiper blade assemblies. 4,007,511, Cl. 15-250.420.

Deininger, Horst, to Hydromatik GmbH. Axial piston machine of oblique-axle construction with tiltable cylinder drum. 4,007,662, Cl. 91-6.500.

De Jonge, Edward N. Model vehicle control system. 4,007,646, Cl. 74-501.00R.

Del-Met Corporation: *See—*
Buerger, Herbert, 4,007,967.

DeLeonardis, Donado: *See—*
DeLeonardis, Michael J.; and DeLeonardis, Donado, 4,007,713.

DeLeonardis, Michael J.; and DeLeonardis, Donado, to Hydrolevel Corporation. Test circuit. 4,007,713, Cl. 122-504.000.

Delhon, Andre: *See—*
Cousse, Henri; Mouzin, Gilbert; Rieu, Jean-Pierre; and Delhon, Andre, 4,008,323.

DeMarco, Joseph H. Folding umbrella. 4,007,753, Cl. 135-25.00R.

Demi, Roy C.: *See—*
Branson, Charles D.; and Demi, Roy C., 4,007,760.
Branson, Charles D.; and Demi, Roy C., 4,007,872.
Branson, Charles D.; and Demi, Roy C., 4,007,907.

Denki Kagaku Kogyo Kabushiki Kaisha: *See—*
Ishii, Masaji; Mikogami, Akio; and Torigai, Tetsuo, 4,008,183.

Dennison Manufacturing Company: *See—*
Fairbanks, Daniel F.; Magnotta, Frank A.; and Pitts, Warren R., 4,008,115.

Denny, Dana W., to General Electric Company. Refrigeration system and control circuit. 4,007,605, Cl. 62-184.000.

de Rosa, Daniel, to Regie Nationale des Usines Renault; and Societe Anonyme dite: Automobiles Peugeot. Remote control device for safety harness webbing winder. 4,007,802, Cl. 180-82.00C.

De Rosa, Richard P., to Raymond Lee Organization, Inc., The, a part interest. Safety electrical plug. 4,008,382, Cl. 200-51.00R.

DeRyke, Thomas Vernon; and Holman, Willard James, to Addressograph Multigraph Corporation. Vertical rise sheet feeder. 4,007,925, Cl. 271-160.000.

De Saedeleer, Roger Isidoor: *See—*
Hellemans, Ludovicus Maria; De Saedeleer, Roger Isidoor; and Verheyen, Johannes Maria, 4,008,048.

Desmarquest et C.E.C. S.A.: *See—*
Aubin, Gerard; Braguier, Michel Arsene; Naturel, Christian; Poulin, Etienne M.; and Wattre, Joseph A., 4,007,969.

Desourdy, Bernard. Trackless train system. 4,007,693, Cl. 105-144.000.

Dettling, Joseph C.: *See—*
Hindin, Saul G.; and Dettling, Joseph C., 4,008,037.
Deuterium Corporation: *See—*
Spevack, Jerome S., 4,008,046.
Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Kropp, Rudolf, 4,008,073.
Von Bebenburg, Walter; and Offermanns, Heribert, 4,008,223.
Wagner, Ewald, 4,008,080.
Wagner, Hans B.; and Broll, Arno, 4,008,091.
De Vlieg, Garrett Howard: *See—*
Bremer, Allen Robert; and De Vlieg, Garrett Howard, 4,007,890.
Diamond, Julius; and Santora, Norman Julian, to William H. Rorer, Inc. Phenylacetic acids. 4,008,269, Cl. 260-515.00A.
Diamond Shamrock Corporation: *See—*
Rowe, Edward A., Jr.; and Cawley, William H., 4,008,101.
Diaz-Romo, Francisco Javier: *See—*
De Avila-Serafin, Antonio; and Diaz-Romo, Francisco Javier, 4,008,415.
Dickerson, Henry R. Auxiliary drive and sprocket adapter for ink fountain roller. 4,007,683, Cl. 101-363.000.
Dickey, Baron Christian, to Ampex Corporation. Motor servo system with multiplier means to drive and servo the motor. 4,008,425, Cl. 318-314.000.
DIEHL: *See—*
Konicke, Helmut; and Politzer, Anton, 4,007,687.
Dietzel, Walter; Matusch, Siegfried; Schaper, Helmut; and Zeichner, Erwin, to Braunschweigische Maschinenbauanstalt. Process and apparatus for continuously producing a high concentration sugar solution. 4,008,098, Cl. 127-19.000.
Dillon, William E.: *See—*
Gawron, Alex F.; and Dillon, William E., 4,007,795.
Dingess, Jack L. Yielding support for vehicle mud flap. 4,007,944, Cl. 280-154.50R.
Dixon, Robert L.; and Allison, Robert E., to Smith International, Inc. Raise drill with replaceable stem. 4,007,799, Cl. 175-340.000.
DND Corporation: *See—*
Sherer, C. Richard; and Webber, Jack, 4,007,705.
Domtar Limited: *See—*
Richardson, Neil George, 4,008,342.
Donovan, James P., to General Equipment and Manufacturing Company, Inc. Phase loss detector. 4,008,417, Cl. 361-53.000.
Dorawala, Tansukhlal G.; Reinhard, Russell R.; and Estes, John H., to Texaco Inc. Steam dealkylation catalyst and process for preparing it. 4,008,181, Cl. 252-465.000.
Dorica, Joseph: *See—*
Wong, Alfred; Prahacs, Steven; and Dorica, Joseph, 4,008,161.
Doring, Christfried; Thomas, Johann; Volcker, Manfred; Sparwald, Volker; and Habersack, Walter, to Siemens Aktiengesellschaft; and Vereinigte Aluminum-Werke Aktiengesellschaft. Apparatus for operating the furnaces of an electrolysis plant. 4,008,142, Cl. 204-225.000.
Dormans, Paul M.: *See—*
Theurer, Donald L.; and Dormans, Paul M., 4,008,369.
Dorner, Armin, to Linde Aktiengesellschaft. Tube furnace, especially for the cracking of hydrocarbons. 4,008,128, Cl. 196-110:000.
Dorr, Karl-Heinz: *See—*
Drechsel, Herbert; Dorr, Karl-Heinz; and Grimm, Hugo, 4,008,316.
Doubt, John J. Golfer's combination tool. 4,007,928, Cl. 273-32.00B.
Dove, Ernest Baker; and Hemens, James Frederick, to Teleflex Morse Ltd. Operator mechanism. 4,007,645, Cl. 74-501.00R.
Dow Chemical Company, The: *See—*
Brubaker, Burton D., 4,007,917.
Evani, Syamalarao; and Corson, Frederick P., 4,008,202.
Gross, James R.; and McFadden, Russell T., 4,008,353.
Leathers, Joel F. M.; and Calvin, Donald W., 4,008,130.
Olstowski, Franciszek, 4,008,185.
Scaggs, Anthony L., 4,008,186.
Zingg, Warren M., 4,007,921.
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Dracka, Oldrich: *See—*
Mackrle, Svatopluk; Mackrle, Vladmir; and Dracka, Oldrich, 4,008,153.
Draghi, William. Automobile cigarette lighter. 4,008,385, Cl. 219-269.000.
Drechsel, Herbert; Dorr, Karl-Heinz; and Grimm, Hugo, to Metallgesellschaft Aktiengesellschaft. Apparatus for producing SO_3 and sulphuric acid by a catalytic of gases which contain SO_2. 4,008,316, Cl. 423-533.000.
Dreikorn, Barry A.; and Thibault, Thomas D., to Eli Lilly and Company. Triazolo(4,3-a)quinoxalines for control of rice. 4,008,322, Cl. 424-250.000.
Drum, David Charles: *See—*
Celeste, Victor; Drum, David Charles; and Nelson, Brian Joseph, 4,007,733.
Du Pont of Canada Limited: *See—*
Dawes, David Haddon; and Gupta, Kashmiri Lal, 4,008,352.
Duchek, Ernest J., to Powers Regulator Company. Pneumatic thermostat. 4,007,873, Cl. 236-49.000.
Duester, Everett L.; and Garrison, Judd F., to John Thomas Batts, Inc. Hanger connector. 4,007,861, Cl. 223-85.000.
Duffy, Thomas E.: *See—*
Compton, William A.; Duffy, Thomas E.; LeCren, Richard T.; and Shekleton, Jack R., 4,008,039.
Dugan, Robert W.; and Edson, Charles R., to Eurosil, G.m.b.H. Method and apparatus for synchronizing an electrodynamic clockwork drive. 4,007,582, Cl. 58-23.00A.
Duisburger Kupferhutte: *See—*
Junghanss, Helmut; Roever, Wilhelm; Neuschutz, Dieter; and Scheffler, Ulrich, 4,008,076.
Dulken, Hartmut: *See—*
Beschoner, Hans-Hermann; Dulken, Hartmut; Guder, Gottfried; and Kassel, Karl-Heinz, 4,008,082.
Duncan, Gordon. Folding blank press with means to scarify blank surfaces intended for gluing. 4,007,671, Cl. 93-58.0ST.
Duncan, Robert: *See—*
Kirby, William E.; and Duncan, Robert, 4,007,544.
Dunlop Holdings Limited: *See—*
Powell, Leslie Vernon; and Edwards, Reginald Harold, 4,007,769.
Du Pont de Nemours, E. I., and Company: *See—*
Chrisp, Joseph Dean, 4,008,108.
Erdody, Robert G.; Harmon, Paul E.; and Tetro, Richard S., 4,007,656.
Hare, James Weaver; and Hughes, Allan Bryce, 4,007,885.
Pye, Donald George, 4,008,083.
Uyeda, Roy Teruyuki, 4,008,331.
Dybwad, Gay Leon, to Bell Telephone Laboratories, Incorporated. Apparatus for bonding and plating with exploding foil. 4,008,117, Cl. 156-380.000.
Dyer, Thomas Harry: *See—*
Sellers, John; Griffiths, Mary; and Dyer, Thomas Harry, 4,007,763.
Dygos, John H.; and Salamon, Karlene W., to G. D. Searle & Co. 2,2-Dimethyl-2-[(7,15,16,17-tetrahydro-17,17-dimethyl-6H-cyclopenta[a]phenanthren-3-yl)oxy]ethyl alkanedioates and intermediates thereto. 4,008,257, Cl. 260-397.100.
Dykes, Willis G.: *See—*
Pluenneke, Ricks H.; and Dykes, Willis G., 4,007,794.
Earnhardt, Danny W. Safety match pack. 4,007,829, Cl. 206-108.000.
Earth Sciences, Inc.: *See—*
Loest, Kent W.; and Ewing, Vernon R., 4,008,307.
Eaton Corporation: *See—*
Hobbie, James R., 4,008,464.
McDermott, Hugh L., 4,008,015.
Eda, Yasuko: *See—*
Agui, Hideo; Nakatsuka, Iwao; Mitani, Toru; Nakashita, Mitsuo; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; and Eda, Yasuko, 4,008,237.
Tobiki, Hisao; Yamada, Hirotada; Nakatsuka, Iwao; Shimago, Kozo; Okano, Shigeru; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; and Eda, Yasuko, 4,008,220.
Eder, Bernhard: *See—*
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Eder, Ulrich: *See—*
Sauer, Gerhard; Hauser, Helmut; Haffer, Gregor; Ruppert, Jurgen; Eder, Ulrich; and Wiechert, Rudolf, 4,008,253.
Edson, Charles R.: *See—*
Dugan, Robert W.; and Edson, Charles R., 4,007,582.
Edwards, Bobbie Lee, to Cincinnati Milacron, Inc. Press and safety latch therefor. 4,007,679, Cl. 100-53.000.
Edwards, Michael L.: *See—*
Bambury, Ronald E.; Edwards, Michael L.; and Miller, Laird F., 4,008,221.
Edwards, Reginald Harold: *See—*
Powell, Leslie Vernon; and Edwards, Reginald Harold, 4,007,769.
Egashira, Hiroji. Grinding apparatus for commutators. 4,007,562, Cl. 51-244.000.
Ehrenfeld, Frank E., Jr.; and Piacente, Anthony N., to Congoleum Corporation. Method for continuously applying a uniform resinous coating by passing the substrate through a free hanging loop containing the coating composition. 4,008,349, Cl. 428-161.000.
Eik, Geir: *See—*
Nybo, Reidar Oivind; and Eik, Geir, 4,007,782.
Einhorn, Ruediger; Chasen, Lee Richard; and Hannes, Karl, to Coats & Clark, Inc. Locking pulley assembly and method of making same. 4,007,532, Cl. 29-159.00R.
Electrotec de Occidente, S.A.: *See—*
De Avila-Serafin, Antonio; and Diaz-Romo, Francisco Javier, 4,008,415.
Eli Lilly and Company: *See—*
Chauvette, Robert R., 4,008,228.
Dreikorn, Barry A.; and Thibault, Thomas D., 4,008,322.
Jones, Charles D., 4,008,238.
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Lacefield, William B., 4,008,232.
Paget, Charles J.; and Wikel, James H., 4,008,242.
Spitzer, Wayne A., 4,008,229.
Wikel, James H.; and Paget, Charles J., 4,008,243.
Wright, Ian G., 4,008,231.
Elias, Jacob K.; and Eriksen, Victor G., to Fauchon Engineering Works Limited. Hydraulic positioning and shock-absorbing apparatus. 4,007,667, Cl. 92-60.000.
Ellis, Herbert B., to United States of America, Navy. Flexible tube section for gimballed IR detectors. 4,008,395, Cl. 250-352.000.
Ellis, Robert G., to Atlas Pacific Engineering Company. Segmenting knife for apple seed celling machine. 4,007,676, Cl. 99-545.000.
Elsea, John W., Jr. Automotive drive system summing multiple independent drives in the differential housing. 4,007,594, Cl. 60-618.000.
Elsing, John W., to Control Data Corporation. Thermally stabilized enclosure for magnetic disk. 4,008,492, Cl. 360-98.000.

Emco Ltd.: *See*—
Thompson, Arthur D.; and Kaibara, Imao, 4,007,500.
Emerson Electric Co.: *See*—
Wesebaum, Paul E.; and Cooper, Wayne E., 4,008,118.
EMI Limited: *See*—
Barron, Donald Robert, 4,008,371.
Emmert, Robert Wayne, to Deere & Company. Valve shifting mechanism. 4,007,757, Cl. 137-315.000.
Endo, Takaya: *See*—
Fujimatsu, Wataru; Sato, Shui; Kojima, Tamotsu; Endo, Takaya; and Minahara, Kazumi, 4,008,086.
Engelhard Minerals & Chemicals Corporation: *See*—
Hindin, Saul G.; and Dettling, Joseph C., 4,008,037.
Engstrom, William J. Concrete forming apparatus for making fence posts and the like. 4,008,026, Cl. 425-117.000.
Enomoto, Satoru; Mukaida, Yutaka; Yanaka, Mikiro; Nishita, Sadao; Wada, Hisayuki; and Takita, Hitoshi, to Kureha Kagaku Kogyo Kabushiki Kaisha. 1,1-Bis(1-methyl-2-vinyl-4,6-heptadienoxy) alkane and method for the production thereof. 4,008,283, Cl. 260-615.00A.
Envirotech Corporation: *See*—
Davis, Steven S., 4,008,158.
Gelfand, Peter C.; Carpenter, Richard A.; and Shoup, Jerry F., 4,008,057.
Erdody, Robert G.; Harmon, Paul E.; and Tetro, Richard S., to Du Pont de Nemours, E. I., and Company; and Black Clawson Company, The, part interest to each. Apparatus for cutting a web of sheet material. 4,007,656, Cl. 83-175.000.
Erickson, Lars, to Walter Kidde & Company, Inc. Hospital latch. 4,007,954, Cl. 292-165.000.
Ericsson, Kjell Eric: *See*—
Wischer, Karl; and Ericsson, Kjell Eric, 4,008,058.
Eriksen, Victor G.: *See*—
Elias, Jacob K.; and Eriksen, Victor G., 4,007,667.
Erlichman, Irving, to Polaroid Corporation. Method of molding plastic elements on a continuous web. 4,008,302, Cl. 264-156.000.
Ervine, Albert W. G., to Remington Arms Company, Inc. Apparatus for feeding articles in serial order. 4,007,854, Cl. 221-167.000.
Escher Wyss G.m.b.H.: *See*—
Welte, Ernst, 4,008,122.
Estes, John H.: *See*—
Dorawala, Tansukhlal G.; Reinhard, Russell R.; and Estes, John H., 4,008,181.
Estrada, Luis Alberto: *See*—
Wielt, Warren Pierce; and Estrada, Luis Alberto, 4,007,867.
Estradier, Francoise: *See*—
Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, 4,007,747.
Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, 4,008,043.
Ethyl Corporation: *See*—
Wiegand, Karl E., 4,008,271.
Eurosil, G.m.b.H.: *See*—
Dugan, Robert W.; and Edson, Charles R., 4,007,582.
Evani, Syamalarao; and Corson, Frederick P., to Dow Chemical Company, The. Aqueous thickening agents derived from vinyl benzyl ether polymers. 4,008,202, Cl. 260-47.0UA.
Evans, Albert B., Jr., to United States of America, Navy. Digital antenna pattern generator for radar simulation. 4,008,476, Cl. 343-17.700.
Eve-N-Tips Industries: *See*—
Matranga, Eve; and Hokama, Yosh, 4,007,748.
Ewart, Wade H., to United States of America, Army. Tactile target alerting system. 4,008,456, Cl. 340-6.00R.
Ewing, Vernon R.: *See*—
Loest, Kent W.; and Ewing, Vernon R., 4,008,307.
Exxon Production Research Company: *See*—
Lock, George A.; and Hoyer, Wilmer A., 4,008,392.
Exxon Research and Engineering Company: *See*—
Muller, Klaus, 4,007,588.
Richards, John F.; and Tripp, Robert G., 4,008,154.
Vadekar, Mohan; and Wilson, Herbert S., 4,008,160.
F.I.A.M.M. Fabbrica Italiana Accumulatori Motocarri Montecchio S.p.A.: *See*—
Frigo, Domenico, 4,007,703.
Fabbrini, Riccardo: *See*—
Gozzo, Franco; Masoero, Marcella; Signorini, Ernesto; and Fabbrini, Riccardo, 4,008,071.
Fairbanks, Daniel F.; Magnotta, Frank A.; and Pitts, Warren R., to Dennison Manufacturing Company. Method for making durable overcoated labels. 4,008,115, Cl. 156-267.000.
Fairchild Camera and Instrument Corporation: *See*—
Murphy, Howard E., 4,008,418.
Fairey Norbon Pty. Ltd.: *See*—
Bonnell, Robert Peter; and Northey, Arthur Douglas, 4,007,715.
Falk, Curt Gunnar; Strandell, Per-Olof; Albrecht, Per Erik; and Wallner, Goran Anders, to AB Metalform. Method of rolling metal blanks. 4,007,617, Cl. 72-234.000.
Fasser, Stuart S.; Suitto, John D., Jr.; and Marklein, William R., to General Electric Company. Capacitance displacement type measuring probe. 4,008,433, Cl. 324-61.00P.
Fauchon Engineering Works Limited: *See*—
Elias, Jacob K.; and Eriksen, Victor G., 4,007,667.
Fauconnet, Michel, to Ateliers des Charmilles S.A. Hydraulic machine. 4,008,010, Cl. 417-405.000.
Fedrigo, Renzo; Borrini, Bartolomeo; Garattini, Vittorio; and Pino, Giovanni, to Schwelmer Eisenwerk Muller & Co. GmbH. Apparatus for forming a sinterable compact of a powder. 4,008,021, Cl. 425-3.000.
Fehlbaum: *See*—
Muller-Deisig, Wolfgang, 4,007,962.
Ferag AG: *See*—
Reist, Walter, 4,007,824.
Ferington, Thomas E.: *See*—
Marans, Nelson S.; Ferington, Thomas E.; and Messina, Philip, 4,008,294.
Fiddler, Theodore E. Compact multiple tube connector apparatus. 4,007,952, Cl. 285-137.00R.
Figa, Rubin. Collapsible game racket. 4,007,929, Cl. 273-73.00R.
Fike, Don G. Marine vessel scrubbing device. 4,007,701, Cl. 114-222.000.
Filtech Corporation: *See*—
Argoudelis, Evangelos, 4,008,450.
Finger, John F.; and Pochop, Merle E., to Sioux Steam Cleaner Corporation. Water heater. 4,007,712, Cl. 122-250.00R.
Fink, Arno: *See*—
Muller, Alfred; and Fink, Arno, 4,008,102.
Finn Tveten & Co. A/S: *See*—
Nybo, Reidar Oivind; and Eik, Geir, 4,007,782.
Finnegan, Richard. Dwelling module. 4,007,565, Cl. 52-169.300.
Firmenich S.A.: *See*—
Maurer, Bruno; Fracheboud, Michel G.; and Ohloff, Gunther, 4,008,184.
Fischer, Adolf, deceased (by Fischer, Caecilia Emma, heiress-at-law); Kropp, Rudolf; and Reicheneder, Franz, deceased (by Reicheneder, Dora Irmgard, heiress-at-law), to BASF Aktiengesellschaft. Substituted pyrazoles. 4,008,249, Cl. 260-310.00R.
Fischer, Caecilia Emma, heiress-at-law: *See*—
Fischer, Adolf, deceased; Kropp, Rudolf; and Reicheneder, Franz, deceased, 4,008,249.
Fishel, Norman A.: *See*—
Gross, David E.; and Fishel, Norman A., 4,008,254.
Fitchman, Arthur; and Wyatt, Terry Doug, to P. R. Mallory & Co., Inc. Pressure vent-sealed primary and secondary alkaline cells. 4,008,354, Cl. 429-56.000.
Fitzharris, Michael J.: *See*—
Maxwell, Richard D.; Pink, John J.; Fitzharris, Michael J.; and Marz, Louis R., 4,007,602.
Flaherty, William H., Jr.: *See*—
Davis, William R.; and Flaherty, William H., Jr., 4,007,557.
Flanagan, James Loton; MacLean, Donald John, Jr.; and West, James Edward, to Bell Telephone Laboratories, Incorporated. Loudspeaking teleconferencing circuit. 4,008,376, Cl. 179-1.0CN.
Fleer, Ernst Otto, to Siemens Aktiengesellschaft. Motor-driven dental handpiece. 4,007,529, Cl. 32-27.000.
Flugge, Jurgen; and Heller, Wilhelm, to Fried. Krupp Huttenwerke. Low-carbon rail steel. 4,008,078, Cl. 75-124.000.
FMC Corporation: *See*—
Spurlin, William V.; and Carroll, Patrick J., 4,007,825.
Folmar, Robert G.; and VanDewoestine, Robert V., to Corning Glass Works. Extrusion mask. 4,008,033, Cl. 425-467.000.
Ford Motor Company: *See*—
Bookout, Charles C., 4,007,648.
Foreman, Donald S., to Honeywell Inc. Interval timer. 4,008,404, Cl. 307-149.000.
Fowler, Timothy J.; and Kanan, Paul G., to Monsanto Company. Unitary plastic pallet for handling heavy powder loads. 4,007,694, Cl. 108-55.100.
Fox, Anthony. Compactor device. 4,007,677, Cl. 100-45.000.
Fox, William Robert: *See*—
Stephenson, Robert Larry; Loomba, Yogendra Singh; and Fox, William Robert, 4,007,948.
Fracheboud, Michel G.: *See*—
Maurer, Bruno; Fracheboud, Michel G.; and Ohloff, Gunther, 4,008,184.
Franek, Jozef Tadeusz; and Porucznik, Paul, to Metal Box Limited, The. Containers. 4,007,621, Cl. 72-351.000.
Franklin, Alpheus A.: *See*—
Hardison, Jack E.; and Franklin, Alpheus A., 4,007,804.
Franz, David Bruce, to United States of America, Navy. Timed missile flight termination system. 4,007,688, Cl. 102-49.500.
Frazier, Calvin H. Patello-femoral prothesis. 4,007,495, Cl. 3-1.910.
Free, David, to Naturvard Research (Canada) Ltd. Ultra-violet sterilizer having a fluid flow diffuser plate. 4,008,045, Cl. 21-102.00R.
Friebel, Eberhard, to Siemens Aktiengesellschaft. Fluid volume apparatus for measuring a fluid under pressure. 4,007,635, Cl. 73-273.000.
Fried. Krupp Gesellschaft mit beschrankter Haftung: *See*—
Junghanss, Helmut; Roever, Wilhelm; Neuschutz, Dieter; and Scheffler, Ulrich, 4,008,076.
Rossner, Heinrich-Otto; Radke, Dietrich; and Hartwig, Jurgen, 4,008,074.
Fried. Krupp Huttenwerke: *See*—
Flugge, Jurgen; and Heller, Wilhelm, 4,008,078.
Frigo, Domenico, to F.I.A.M.M. Fabbrica Italiana Accumulatori Motocarri Montecchio S.p.A. Two-tone sound generator. 4,007,703, Cl. 116-142.0FP.
Fritsche, Peter, to Glasurit Werke M. Winkelmann GmbH. Electrodeposited coatings. 4,008,140, Cl. 204-181.000.
Frolov, Jury Fedorovich; Naryshkin, Jury Anatolievich; Cherednichenko, Vladimir Semenovich; Piljukov, Jury Fedorovich; Orlov, Gennady Ivanovich; Mikulinsky, Aron Semenovich; Suturin, Serafim Nikolaevich; Slobodkin, Leonid Vladimirovich; and Dashkov, Kon-

stantin Stepanovich. Apparatus for continuous refining of metals. 4,008,364, Cl. 13-20.000.

Frye, Jim. Rotary hearth furnace. 4,007,695, Cl. 110-13.000.

Fuji Photo Film Co., Ltd.: *See—*
Aono, Masazumi; Shindo, Shuichi; and Miyazako, Takushi, 4,008,087.
Ikeda, Tomoaki; Ikeda, Sadaharu; Mizobuchi, Yuzo; and Tomotsu, Takeshi, 4,008,084.

Fuji Photo Optical Co., Ltd.: *See—*
Asano, Seizi, 4,008,356.

Fujimatsu, Wataru; Sato, Shui; Kojima, Tamotsu; Endo, Takaya; and Minahara, Kazumi, to Konishiroku Photo Industry Co., Ltd. Silver halide emulsion containing photographic yellow coupler. 4,008,086, Cl. 96-56.500.

Fujimoto, Showhey: *See—*
Ueno, Atsushi; Sakai, Kiyoharu; and Fujimoto, Showhey, 4,008,372.

Fujino, Masahiko; Fukuda, Tsunehiko; and Shinagawa, Susumu, to Takeda Chemical Industries, Ltd. Nonapeptide amide analogs of luteinizing releasing hormone. 4,008,209, Cl. 260-112.5LH.

Fujisawa Pharmaceutical Co., Ltd.: *See—*
Iwata, Takashi; Nakanishi, Kazuo; Nagao, Minoru; Ishida, Seiichi; and Kamuro, Yasuo, 4,008,070.

Fujita, Yoshimasa; Matsumoto, Akiyoshi; Ishikawa, Hachiro; Hishida, Tadashi; Kato, Hideo; and Takamisawa, Hiroshi, to Mitsubishi Chemical Industries Ltd.; and Seikagaku Kogyo Co., Ltd. Process for the isomerization of glucose into fructose. 4,008,124, Cl. 195-31.00F.

Fujita, Yoshitoshi, to Victor Company of Japan, Limited. Channel selecting apparatus. 4,008,436, Cl. 325-335.000.

Fujitsu Ltd.: *See—*
Kanda, Yasunori, 4,008,462.
Maekawa, Shunichi; and Kisaki, Hitoshi, 4,008,484.

Fukuda, Minoru: *See—*
Miyoshi, Eiji; Fukuda, Minoru; Hagiwara, Yasuhiko; and Asai, Yasuhiro, 4,008,103.

Fukuda, Tsunehiko: *See—*
Fujino, Masahiko; Fukuda, Tsunehiko; and Shinagawa, Susumu, 4,008,209.

Fukushima, Fumiaki; Nozaki, Hiroshi; Tanaka, Keisuke; and Kanagawa, Takashi, to Nichireki Kagaku Kogyo Co., Ltd. Paving compositions and method for producing the same. 4,008,095, Cl. 106-235.000.

Funstuf, Inc.: *See—*
Hornsby, James R., Jr., 4,007,936.

Futsukaichi, Osamu: *See—*
Ikeda, Masao; Miyamoto, Shigeo; Nozawa, Thutomu; Kurobe, Akira; and Futsukaichi, Osamu, 4,008,219.

G. D. Searle & Co.: *See—*
Dygos, John H.; and Salamon, Karlene W., 4,008,257.

Gaccione, Carmine. Quick-release dental clamp. 4,007,530, Cl. 32-36.000.

Gaffney, Edward J. Reclining elevator chair. 4,007,960, Cl. 297-71.000.

Gall, John S., to Celanese Corporation. Heat stabilized polyalkylene terephthalate resin composition. 4,008,199, Cl. 260-40.00R.

Gallien, Jacqueline: *See—*
Kalopissis, Gregoire; Gascon, Jean; Bugaut, Andree; Gallien, Jacqueline; and Gaston-Breton, Hubert, 4,008,272.

Galloway, John W., to Armco Steel Corporation. Continuous sheet pickling apparatus. 4,007,750, Cl. 134-83.000.

Galloway, Ronald W.: *See—*
Mancini, Angelo J.; and Galloway, Ronald W., 4,007,901.

Galperin, Abram Isaevich; Vishnyakov, Lev Vladimirovich; Pokrovsky, Boris Vladimirovich; Kalganov, Vladimir Ioganovich; Vasiliev, Boris Borisovich; and Kotikov, Igor Nikolaevich. Device for bending thin-walled pipes. 4,007,622, Cl. 72-393.000.

Garattini, Vittorio: *See—*
Fedrigo, Renzo; Borrini, Bartolomeo; Garattini, Vittorio; and Pino, Giovanni, 4,008,021.

Garrison, Judd F.: *See—*
Duester, Everett L.; and Garrison, Judd F., 4,007,861.

Gascon, Jean: *See—*
Kalopissis, Gregoire; Gascon, Jean; Bugaut, Andree; Gallien, Jacqueline; and Gaston-Breton, Hubert, 4,008,272.

Gassaway, James Scott. Equipment security locking device. 4,007,613, Cl. 70-58.000.

Gasser, Walter: *See—*
von Rutte, Richard; and Gasser, Walter, 4,008,172.

Gasson, Edward James; Krosnar, Thomas Charles, deceased (by Krosnar, Alena, legal representative); and Marrian, Stanley Frederic, to BP Chemicals International Limited. Catalyst composition. 4,008,179, Cl. 252-437.000.

Gaston-Breton, Hubert: *See—*
Kalopissis, Gregoire; Gascon, Jean; Bugaut, Andree; Gallien, Jacqueline; and Gaston-Breton, Hubert, 4,008,272.

Gaston County Dyeing Machine Company: *See—*
Turner, James Keith; Sturkey, William Cleere; and Aurich, Christoph W., 4,007,517.

Gawron, Alex F.; and Dillon, William E., to Skil Corporation. Attachment for a rotary-hammer tool. 4,007,795, Cl. 173-50.000.

Gazda, Hans Otto Ernst. Method of deionizing solutions. 4,008,135, Cl. 204-149.000.

Gazda, Imre I., to Otis Engineering Corporation. Hydraulic jar. 4,007,798, Cl. 175-297.000.

Geisler, Harald: *See—*
Langer, Rolf; Thierfelder, Peter; and Geisler, Harald, 4,007,581.

Gelbein, Abraham P.; and Kwon, Joon Taek, to Lummus Company, The. Production of epoxy compounds from olefinic compounds. 4,008,133, Cl. 204-80.000.

Gelbein, Abraham P.; Paustian, John E.; and Sze, Morgan C., to Lummus Company, The. Nicotinamide production. 4,008,241, Cl. 260-295.50A.

Gele, Pierre J.: *See—*
Laprade, Bernard R.; Laprade, Xavier J.; and Gele, Pierre J., 4,007,718.

Gelfand, Peter C.; Carpenter, Richard A.; and Shoup, Jerry F., to Envirotech Corporation. Electrostatic precipitator electrode cleaning system. 4,008,057, Cl. 55-105.000.

General American Transportation Corporation: *See—*
Hurst, Doug, 4,007,766.

General Binding Corporation: *See—*
Staats, Henry N., 4,008,305.

General Electric Company: *See—*
Bowling, Teamus, 4,008,454.
Carrico, Philip Hugh, 4,008,022.
Denny, Dann W., 4,007,605.
Fasser, Stuart S.; Suitto, John D., Jr.; and Marklein, William R., 4,008,433.
Henderson, Alfred J., Jr., 4,008,391.
Moeller, Richard E., 4,008,346.
Morris, George E.; and Poling, Ronald W., 4,008,449.
Rhudy, Ralph G.; and Casanova, Hans H., 4,008,409.
Wielt, Warren Pierce; and Estrada, Luis Alberto, 4,007,867.

General Equipment and Manufacturing Company, Inc.: *See—*
Donovan, James P., 4,008,417.

General Foods Corporation: *See—*
Kung, Jo-Fen T.; Clinton, William P.; and Soukup, Robert J., 4,008,340.

General Signal Corporation: *See—*
Auer, John H., Jr., 4,007,897.

Genta, Guido Ruggiero Lorenzo: *See—*
Renfrew, Edgar Earl; and Genta, Guido Ruggiero Lorenzo, 4,008,262.

Gernhardt, Paul D., to Slater Electric Inc. Knockout window means. 4,007,852, Cl. 220-3.200.

Getz, Edward J.; Barbieri, Thomas; and Stauffer, Robert J., to Westinghouse Electric Corporation. Corrugated-paperboard wrapper for packaging electric lamps, and resulting lamp package. 4,007,836, Cl. 206-422.000.

Gewartowski, Steve A., to Universal Oil Products Company. Fractionation to remove a high-boiling material and a dissolved substance. 4,008,150, Cl. 208-352.000.

Geyer, Gerhard, to Siemens Aktiengesellschaft. Coupling for bus bar system. 4,008,366, Cl. 174-88.00B.

Gib Precision Limited: *See—*
Orwin, Olaf John Barclay, 4,007,818.

Gibson, Kirk R.: *See—*
Jacobson, Robert L.; and Gibson, Kirk R., 4,008,174.

Gilb, Tyrell T., to Simpson Manufacturing Co., Inc. Truss top bearing clip. 4,007,573, Cl. 52-696.000.

Gilsdorf, Richard C.; and Browder, Lewis B., to Bell & Howell Company. Portable video tape recorder. 4,008,489, Cl. 360-85.000.

Gits, Jacqueline, to Recherche et Industrie Therapeutiques (R.I.T.). Varicella-zoster virus vaccine and preparation thereof. 4,008,317, Cl. 424-89.000.

Giulie, Joe D., to Minnesota Mining and Manufacturing Company. Binder unit for stapled booklets. 4,007,950, Cl. 281-25.00R.

Glabiszewski, Richard, to Otto Boch Orthopadische Industries KG. Connection between a cosmetic cover and a prosthetic part. 4,007,496, Cl. 3-2.000.

Glander, Fritz; and Voigt, Hermann Uwe, to Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft. High voltage cable. 4,008,113, Cl. 156-52.000.

Glasrock Products, Inc.: *See—*
Sauer, Barry W., 4,007,494.

Glasurit Werke M. Winkelmann GmbH: *See—*
Fritsche, Peter, 4,008,140.

Glenn, Eldridge Myles: *See—*
Callahan, William A.; Glenn, Eldridge Myles; and Rector, Douglas L., 4,008,326.

Glenn, Robert: *See—*
Barouh, Victor; and Glenn, Robert, 4,007,823.

Glesmann, Herbert C., to Ward Paper Box Company. Method and apparatus for making bows. 4,007,860, Cl. 223-46.000.

Glick, Arthur; and Chirgwin, Lester Daniel, Jr., to American Cyanamid Company. Process for extruding green polyglycolic acid sutures and surgical elements. 4,008,303, Cl. 264-210.00F.

Glitsch, Inc.: *See—*
Cecil, Shelby, 4,008,384.

Gluck, Maternus; Kriegner, Walter; and Eder, Bernhard, to Semperit Aktiengesellschaft. Foam body and process for the production thereof. 4,007,556, Cl. 47-56.000.

Gold Kist Inc.: *See—*
Steele, Bobby C.; Barr, Douglas R.; Hunt, Charles T.; and Ayres, James L., 4,008,210.

Goldsmith, Elmar L., to PPG Industries Canada Ltd. Preferential solution mining process. 4,007,964, Cl. 299-4.000.

Goloff, Alexander, to Caterpillar Tractor Co. Oil cooled seal for rotary engine. 4,008,016, Cl. 418-92.000.

Goodyear Aerospace Corporation: *See—*
Berger, Robert E., 4,007,814.

Goransson, Pehr-Gunnar Heine, to Bag System AB. System for handling goods in selfservice shops. 4,007,809, Cl. 186-1.0AC.

Gordon, Alvin S.: *See*—
Johnson, Joseph H.; Gordon, Alvin S.; and Norris, William P., 4,008,139.

Gordon, Bernard M.: *See*—
Neumann, Leopold; and Gordon, Bernard M., 4,008,405.

Goren, Robert N., to Xerox Corporation. Dual mode electrostatographic printing machine. 4,007,981, Cl. 355-4.000.

Gorin, Everett, to Continental Oil Company. Regenerative sulfur dioxide scrubbing system. 4,008,310, Cl. 423-242.000.

Gorin, Everett: *See*—
Clancey, James T.; Gorin, Everett; Reichl, Eric H.; and Rice, Charles H., 4,008,054.

Goto, Kuniaki; Asai, Harumi; and Natsuume, Tadao, to Nippon Zeon Co., Ltd. Novel phenol derivatives. 4,008,284, Cl. 260-619.00D.

Gould Inc.: *See*—
Christianson, Clinton C.; and Bourke, Robert F., 4,008,423.

Gozzo, Franco; Masoero, Marcella; Signorini, Ernesto; and Fabbrini, Riccardo, to Montedison Fibre S.p.A. Adducts of carbamoyl sulphoxides. 4,008,071, Cl. 71-99.000.

Gradl, Ottmar; Loebel, Wolf; Rossmann, Axel; Zech, Herbert; and Zahring, Gerhard, to Motoren-und Turbinen-Union Munich GmbH. Axial-flow rotor wheel for high-speed turbomachines. 4,008,000, Cl. 416-214.00A.

Graham, Lawrence D.: *See*—
Vishnevsky, Constantine; and Graham, Lawrence D., 4,008,052.

Gramsall, Johanna: *See*—
Gruber, Wolfgang; Bergmeyer, Hans Ulrich; Nelboeck-Hochstetter, Michael; Beaucamp, Klaus; Holz, Gunter; Gramsall, Johanna; and Lang, Gunter, 4,008,127.

Grandview Industries, Limited: *See*—
Ronden, Clifford P.; and Rabel, Imre, 4,008,028.

Gray, Robert E.; and Boord, Leslie F., to Mine Safety Appliances Company. Respirator pressure-demand exhalation valve. 4,007,758, Cl. 137-472.000.

Great Canadian Oil Sands Limited: *See*—
Bain, Frederick A.; and Roberts, John O. L., 4,008,146.

Green, Geoffrey William; Hurle, Donald Thomas James; and Joyce, Gordon Charles, to National Research Development Corporation. Automatically controlled crystal growth. 4,008,387, Cl. 235-151.100.

Griffiths, Ciwa; and Thompson, Dean O. Means and techniques for establishing hearing deficiencies. 4,007,731, Cl. 128-2.00Z.

Griffiths, Mary: *See*—
Sellers, John; Griffiths, Mary; and Dyer, Thomas Harry, 4,007,763.

Grimm, Hugo: *See*—
Drechsel, Herbert; Dorr, Karl-Heinz; and Grimm, Hugo, 4,008,316.

Gross, David E.; and Fishel, Norman A., to Monsanto Company. Ceria catalyzed conversion of phenols to dibenzofurans in the presence of water vapor. 4,008,254, Cl. 260-346.20M.

Gross, James R.; and McFadden, Russell T., to Dow Chemical Company, The. Water swellable articles. 4,008,353, Cl. 428-522.000.

Grossag Gesellschaft Mit Beschrankter Haftung: *See*—
Hacker, Dieter; Jager, Rolf; and Lettau, Dieter, 4,008,453.

Groupement Europeen De La Cellulose: *See*—
Carles, Jacques E.; and Berge, Louis J., 4,008,120.

Grover, Donald L.: *See*—
Tiepel, Erich W.; Lee, Pang K.; Kitzes, Arnold S.; and Grover, Donald L., 4,008,171.

Gruber, Wolfgang; Bergmeyer, Hans Ulrich; Nelboeck-Hochstetter, Michael; Beaucamp, Klaus; Holz, Gunter; Gramsall, Johanna; and Lang, Gunter, to Boehringer Mannheim G.m.b.H. Process for the preparation of cholesterol oxidase. 4,008,127, Cl. 195-65.000.

Grumman Aerospace Corporation: *See*—
Aleck, Benjamin J., 4,007,616.

Gruzintsev, Igor Andreevich: *See*—
Scherbakov, Vsevolod Sergeevich; Gruzintsev, Igor Andreevich; and Zolotukhin, Viktor Mikhailovich, 4,008,011.

GTE Sylvania Incorporated: *See*—
Murray, Donald E.; and Bricker, Daniel W., 4,008,040.

Guba, Peter. Solar collector. 4,007,728, Cl. 126-271.000.

Guder, Gottfried: *See*—
Beschoner, Hans-Hermann; Dulken, Hartmut; Guder, Gottfried; and Kassel. Karl-Heinz, 4,008,082.

Guenther, Arthur William Edward. Putting device. 4,007,938, Cl. 273-177.00R.

Guillard, Dzidris, to Societe C.M.V. Machine for reproducing an article from a pattern. 4,007,559, Cl. 51-101.0LG.

Gulf Research & Development Company: *See*—
Ahle, James L., 4,008,069.

Gullfiber AB: *See*—
Ampler, Leif Carl Gustaf, 4,008,030.

Gundlach, Robert W., to Xerox Corporation. Reverse angle mounted ink-splitting doctor blade. 4,007,682, Cl. 101-348.000.

Gupta, Kashmiri Lal: *See*—
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Gustafsson, Berth Ulrik, to Projectus Industriprodukter AB. Apparatus for defrosting of an evaporator in a heat pump. 4,007,603, Cl. 62-151.000.

Gustavsson, John Kenneth Crister; and Sjogren, Bjorn Christer, to Aktiebolaget Electrolux. Compactor press assembly. 4,007,678, Cl. 100-52.000.

Gutierrez, William A.; Wilson, Herbert L.; and Yee, Edward M., to United States of America, Army. Method of fabricating III-V photocathodes. 4,008,106, Cl. 148-172.000.

Haake, Frederick L., to United States of America, Navy. Smoke marker. 4,007,691, Cl. 102-90.000.

Habersack, Walter: *See*—
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Hacker, Dieter; Jager, Rolf; and Lettau, Dieter, to Grossag Gesellschaft Mit Beschrankter Haftung, a part interest. Thermal changeover switch. 4,008,453, Cl. 337-345.000.

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Haendler, Lucien; and Mangeot, Georges, to Institut Francais de Recherches Fruitieres Outre-Mer (I.F.A.C.). Method of preparing avocado-pear pulp powder containing cucurbita moscato as a stabilizer and product. 4,008,336, Cl. 426-270.000.

Haenni & Cie Aktiengesellschaft: *See*—
Janach, Walter; and Kipfer, Peter, 4,007,800.

Haensel, Vladimir; and Hayes, John C., to UOP Inc. Low density refractory inorganic oxide particles having high micropore volume. 4,008,182, Cl. 252-466.0PT.

Haffer, Gregor: *See*—
Sauer, Gerhard; Hauser, Helmut; Haffer, Gregor; Ruppert, Jurgen; Eder, Ulrich; and Wiechert, Rudolf, 4,008,253.

Hagiwara, Yasuhiko: *See*—
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Hall, James Robert; and Lyon, John Jeffrey, to RCA Corporation. Correlator to reduce bin straddle in a collision avoidance system. 4,008,471, Cl. 343-6.5LC.

Hallam Polymers & Engineering Limited: *See*—
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Hamalainen, Lauri: *See*—
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Hamma, Noritaka: *See*—
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Hammann, Ingeborg: *See*—
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Hankis, John L., to Hankis, Roy A. Newspaper delivery box signal. 4,007,870, Cl. 232-34.000.

Hankis, Roy A.: *See*—
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Hannes, Karl; and Rossi, Paul C., to Coats & Clark, Inc. Cast articulated tool. 4,007,524, Cl. 30-266.000.

Hannes, Karl: *See*—
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Hans, Waldemar; and Wagner, Herbert, to Robert Bosch G.m.b.H. Electromagnetic fuel injection valve. 4,007,880, Cl. 239-585.000.

Hansen, Carl E. Bridge composed of individual sections assembled by means of an assembling unit. 4,007,507, Cl. 14-17.000.

Hansen, Ole Kaae, to Aarhus Oliefabrik A/S. Process for removal of water-soluble carbohydrates in the production of plant protein products. 4,008,334, Cl. 426-46.000.

Hara, Akio: *See*—
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Hardison, Jack E.; and Franklin, Alpheus A., to Atlantic Richfield Company. Apparatus for removal of condensation from a marine gas exploder device. 4,007,804, Cl. 181-118.000.

Hare, James Weaver; and Hughes, Allan Bryce, to Du Pont de Nemours, E. I., and Company. Flexible traverse guide assembly. 4,007,885, Cl. 242-43.00R.

Harmon, Paul E.: *See*—
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Harris, James A.: *See*—
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Harris, Steven K.; and Schiffman, Stanley P. Doorknob guard. 4,007,956, Cl. 292-347.000.

Hart, Donald P.: *See*—
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Hartel, Erwin H., to Boeing Company, The. Method and apparatus for minimizing axial friction forces in a cylinder-piston shock absorber. 4,007,894, Cl. 244-104.0FP.

Hartman, Carl C. Semi-automatic packing of packages. 4,007,575, Cl. 53-26.000.

Hartwig, Jurgen: *See*—
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Hascall, Norman E. Method and means for sealing door edges. 4,007,569, Cl. 52-309.300.

Haslau, Horst Eugen; and Rigsbee, William Emerson, to RCA Corporation. Coil winding machine. 4,007,881, Cl. 242-4.00B.

Hattori, Kenichi: *See*—
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Haupt, Werner, to Otto Boch Orthopadische Industries KG. Artificial foot with ankle joint. 4,007,497, Cl. 3-33.000.

Hauschild, Ulrich, to Kali-Chemie Aktiengesellschaft. Granulated fertilizer composition and method for its preparation. 4,008,065, Cl. 71-34.000.

Hauser, Helmut: *See*—
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Haviland, Girard S., to Loctite Corporation. Gasket material applicator. 4,007,704, Cl. 118-6.000.

Hayasaka, Akio; Noda, Hideo; Suzuki, Michio; and Kondo, Hiroyuki, to Hitachi, Ltd. Method of manufacturing semiconductor devices with local oxidation of silicon surface. 4,008,107, Cl. 148-175.000.
Hayata, Shinzi: *See—*
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Hayes, John C.: *See—*
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Haynes, Harvey H.; Albertsen, Norman D.; and Kahn, Lawrence F., to United States of America, Navy. Multiple seafloor storage and supply system. 4,007,700, Cl. 114-74.00T.
Hays, James C.: *See—*
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Heebink, Fredrick. Fireplace damper. 4,007,730, Cl. 126-286.000.
Heftmann, Rex Walter, to Rax Works, Inc. Car rack for holding surfboards or the like. 4,007,862, Cl. 224-42.10B.
Heger, Werner: *See—*
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Heggdal, Bernhard, deceased (by Heggdal, Helene, legal representative), to Austines, Leif N. Turnable window arrangements. 4,007,558, Cl. 49-252.000.
Heggdal, Helene, legal representative: *See—*
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Hellemans, Ludovicus Maria; De Saedeleer, Roger Isidoor; and Verheyen, Johannes Maria, to AGFA-GEVAERT N.V. Installation for the discontinuous production of polyethylene terephthalate. 4,008,048, Cl. 23-260.000.
Heller, Wilhelm: *See—*
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Helmstadter, Glenn D. Adjustable gun support. 4,007,554, Cl. 42-94.000.
Hemens, James Frederick: *See—*
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Henderson, Alfred J., Jr., to General Electric Company. Device for measuring lighting effectiveness. 4,008,391, Cl. 250-208.000.
Henkel & Cie G.m.b.H.: *See—*
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Hennig, Karl-Friedrich; Kalthenthaler, Wolfgang; Heger, Werner; Isernhagen, Fritz; Kramer, Manfred; and Pape, Wilhelm, to WABCO Westinghouse GmbH. Seal arrangement for rotary engines. 4,008,017, Cl. 418-129.000.
Henning, Jack A. Back-off apparatus and method for retrieving pipe from wells. 4,007,790, Cl. 166-299.000.
Henrick, Clive A.; and Staal, Gerardus B., to Zoecon Corporation. Cyclopropyl methyl esters. 4,008,258, Cl. 260-410.000.
Henry, Robert Malcolm: *See—*
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Hercules Incorporated: *See—*
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Hermann, Klaus Dieter. Labelling device. 4,008,119, Cl. 156-541.000.
Hernqvist, Karl Gerhard, to RCA Corporation. Ultra-violet gas laser. 4,008,445, Cl. 331-94.50D.
Herrmann, Manfred: *See—*
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Hewett, Colin Leslie; and Savage, David Samuel, to Akzona Incorporated. Benzo-bicyclononene derivatives. 4,008,277, Cl. 260-571.000.
Hierath, Leonard L.; and Holmes, W. Kendall, to Magrath, Joseph M. Liquid dispenser of the metering type. 4,007,855, Cl. 222-26.000.
Higurashi, Minoru: *See—*
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Hill, David E.: *See—*
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Hinachi, Matatoyo; Oishi, Kazuo; Kato, Toshiaki; Matsui, Takeshi; and Yamada, Takashi, to Nippon Soken, Inc. Collision predicting operation system. 4,008,473, Cl. 343-7.500.
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Hinchman, Leslie R.; and Hinchman, Robert B., to Caldwell, Bessie L., a part interest. Power device. 4,007,591, Cl. 60-325.000.
Hinchman, Robert B.: *See—*
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Hindin, Saul G.; and Dettling, Joseph C., to Engelhard Minerals & Chemicals Corporation. Compositions and methods for high temperature stable catalysts. 4,008,037, Cl. 431-2.000.
Hinkle, Donald B. Safety container. 4,007,849, Cl. 215-213.000.
Hiraga, Masaharu, to Sankyo Electric Company, Limited. Refrigerant compressor. 4,008,005, Cl. 417-269.000.
Hirai, Kenji, to Tokyo Shibaura Electric Co., Ltd. Microwave oscillation device whose oscillation frequency is controlled at the resonance frequency of a dielectric resonator. 4,008,446, Cl. 331-96.000.
Hiraki, Shigeyoshi: *See—*
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Hirono, Yoshihiko; Ishikawa, Hisao; Iwataki, Isao; Sawaki, Mikio; Okabe, Takashi; Takiguchi, Daigaku; and Maeda, Kuniyasu, to Nippon Soda Company, Limited. Oxacyclohexane derivatives. 4,008,067, Cl. 71-88.000.
Hirose, Isao; and Okitsu, Hiroyuki, to Teijin Limited. Process for preparing glycols. 4,008,286, Cl. 260-635.00H.
Hishida, Tadashi: *See—*
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Hochstein, Peter A. Method and apparatus for monitoring oil degradation. 4,007,629, Cl. 73-53.000.
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Hold, Peter; and Hinchcliffe, John Crossley, to USM Corporation. Controlled deflection roll assembly. 4,007,522, Cl. 29-116.0AD.
Holden, Herbert K.; and Mansfield, Peter W., to American Filtrona Corporation. Crimper assembly. 4,007,668, Cl. 93-1.00C.
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Holoubek, George H.; and Burzlaff, Henry A., to Dart Industries Inc. U. V. curing system. 4,008,401, Cl. 250-453.000.
Holton, William C., to Texas Instruments Incorporated. Integrated optical circuits. 4,007,978, Cl. 350-96.0WG.
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Hurt, William S., to Rohm and Haas Company. O,S-dialkyl O-benzoylphenyl phosphorothiolates and phosphorodithioates, pesticidal compositions and methods of use. 4,008,319, Cl. 424-214.000.
Hux, Fred M.; and Hudson, Thomas. Fire fighting apparatus. 4,007,793, Cl. 169-25.000.
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Ikrath, Kurt; Kennebeck, William; and Wills, Jack, to United States of America, Army. Rifle barrel serving as radio antenna. 4,008,478, Cl. 343-720.000.
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Inoue, Mayumi; Shibata, Masaru; Takahashi, Kenzo; and Nakatani, Sadao, to Sumitomo Bakelite Company, Limited; and Inoue, Mayumi. Film or sheet material having antibacterial and antifungal activities. 4,008,351, Cl. 428-411.000.
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Ishizuka, Takashi; and Miwa, Naoki, to Nitto Electric Industrial Co., Ltd. Aqueous insulating varnishes. 4,008,195, Cl. 260-29.20N.
Isoard, Bernard, to Rhone-Poulenc-Textile. Apparatus for the automatic doffing of textile machines such as winding machines. 4,007,882, Cl. 242-18.00R.
Isoard, Bernard, to Rhone-Poulenc-Textile. Simultaneous bobbin winding station. 4,007,883, Cl. 242-35.50R.
Itaya, Nobushige: *See—*
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Itoh, Sanji: *See—*
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Itoh, Takuji; Sakurada, Satoshi; Okano, Shohei; and Obayashi, Takashi, to Toa Nenryo Kogyo Kabushiki Kaisha. Process of hydro-refining hydrocarbon oils. 4,008,149, Cl. 208-216.000.
Itou, Michihisa: *See—*
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Iwata, Takashi; Nakanishi, Kazuo; Nagao, Minoru; Ishida, Seiichi; and Kamuro, Yasuo, to Nissan Chemical Industries Co., Ltd.; and Fujisawa Pharmaceutical Co., Ltd. Method for thinning young fruits and blossoms and agent therefor. 4,008,070, Cl. 71-92.000.
Iwataki, Isao: *See—*
Hirono, Yoshihiko; Ishikawa, Hisao; Iwataki, Isao; Sawaki, Mikio; Okabe, Takashi; Takiguchi, Daigaku; and Maeda, Kuniyasu, 4,008,067.

Iyeta, Motoi, to Nippon Gakki Seizo Kabushiki Kaisha. Mechanism for supporting pickup arm in disc record player of linear tracking arm type. 4,007,939, Cl. 274-23.00A.

Izawa, Akio: *See—*
Agui, Hideo; Nakatsuka, Iwao; Mitani, Toru; Nakashita, Mitsuo; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; and Eda, Yasuko. 4,008,237.
Tobiki, Hisao; Yamada, Hirotada; Nakatsuka, Iwao; Shimago, Kozo; Okano, Shigeru; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; and Eda, Yasuko. 4,008,220.

Izumi, Masahiko. Soy sauce brewing method. 4,008,333, Cl. 426-44.000.

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Okamoto, Miyoshi; Watanabe, Koji; Izumi, Zenji; Aya, Toshihiko; and Kitagawa, Hideaki. 4,008,344.

J. I. Case Company: *See—*
Baylor, John M., 4,007,972.

J. P. Stevens & Co., Inc.: *See—*
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J. R. Clarkson Company, The: *See—*
Clarkson, Curtis W., 4,007,911.

Jackson, Bernie F., to Nortron Corporation. System and method for identifying angular location and amount of wheel balancing weights. 4,007,642, Cl. 73-462.000.

Jackson, Jimmy; and Roquemore, William D., to Hays, James C., a part interest. Adjustable stem sprinkler drop. 4,007,877, Cl. 239-209.000.

Jackson, Myron W.: *See—*
Laedtke, Donald O.; and Jackson, Myron W., 4,007,772.

Jacobson, Robert L.; and Gibson, Kirk R., to Chevron Research Company. Process for regenerating a solid copper-chromium reactant used in the removal of hydrogen sulfide from hydrogen recycle gas. 4,008,174, Cl. 252-411.00S.

Jaegtnes, Karl O.; and Braytenbah, Andrew S., to Westinghouse Electric Corporation. Power plant and system for accelerating a cross compound turbine in such plant, especially one having an HTGR steam supply. 4,007,597, Cl. 60-707.000.

Jaegtnes, Karl O.: *See—*
Braytenbah, Andrew S.; and Jaegtnes, Karl O., 4,007,595.
Braytenbah, Andrew S.; and Jaegtnes, Karl O., 4,007,596.

Jager, Rolf: *See—*
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Jagur-Grodzinski, Joseph; Vofsi, David; and Cabasso, Israel, to Yeda Research and Development Co., Ltd. Polymer alloy membranes consisting of inherently entangled blends of polymeric phosphonate and second polymer component containing ester groups or polystyrene. 4,008,191, Cl. 260-17.00R.

James, John P., to Phillips Petroleum Company. Recycle of isoparaffin-butylene hydrocarbon to isoparaffin-propylene alkylation reaction. 4,008,292, Cl. 260-683.450.

Janach, Walter; and Kipfer, Peter, to Haenni & Cie Aktiengesellschaft. Force measuring device. 4,007,800, Cl. 177-209.000.

Janssen, Jos M., to JMJ Werkzeugmaschinen GmbH fuer Feinbearbeitung. Two wheel lapping machine. 4,007,560, Cl. 51-111.00R.

Japanese National Railways: *See—*
Kitsuda, Toshiyuki; Hattori, Kenichi; Nakagawa, Hiromi; Wakao, Mitsuru; and Matsuda, Tsunehisa, 4,008,093.

Jeco Co., Ltd.: *See—*
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Jensen, Elvin R. Texture applicator. 4,007,879, Cl. 239-214.000.

Jensen, Philip B.: *See—*
Silverbush, Herbert M.; and Jensen, Philip B., 4,007,537.

Jervis B. Webb Company: *See—*
Brandon, Ross H.; and Zeffer, Peter P., 4,007,533.

Jeter, John D., to Texas Dynamatics, Inc. Device for drilling a hole in the side wall of a bore hole. 4,007,797, Cl. 175-26.000.

JMJ Werkzeugmaschinen GmbH fuer Feinbearbeitung: *See—*
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John Thomas Batts, Inc.: *See—*
Duester, Everett L.; and Garrison, Judd F., 4,007,861.

Johnson, Charles M., to Baisch, J. Carroll. Method for recovery of crude oil from oil wells. 4,007,791, Cl. 166-300.000.

Johnson, Edward Oscar, to RCA Corporation. Electronic timepiece. 4,007,583, Cl. 58-50.00R.

Johnson, Henry Charles, to RCA Corporation. Stabilizing and calibration circuit for FM-CW radar ranging systems. 4,008,475, Cl. 343-14.000.

Johnson, Joseph H.; Gordon, Alvin S.; and Norris, William P., to United States of America, Navy. Fluorinated compounds. 4,008,139, Cl. 204-162.00R.

Johnson, Kendall R., to Universal Cooperatives, Inc. Milk line check valve. 4,007,710, Cl. 119-14.030.

Johnson, Leopold J., to United States of America, Navy. Variable input power supply. 4,008,427, Cl. 321-18.000.

Jones, Alan Lytton; and Kellogg, Robert Melroy, to International Business Machines Corporation. Centrifuge fluid container. 4,007,871, Cl. 233-27.000.

Jones, Charles, to Curtiss-Wright Corporation. Spark plug and rotary engine combination. 4,007,714, Cl. 123-8.090.

Jones, Charles D., to Eli Lilly and Company. 24-Methyl-14A -aza-D-homo-cholestadiene derivatives. 4,008,238, Cl. 260-289.0AZ.

Jones, Kenneth R., to Allis-Chalmers Corporation. Offset valve lifter effecting valve rotation. 4,007,716, Cl. 123-90.280.

Jones, Marvin R., to Cameron Iron Works, Inc. Annular blowout preventer. 4,007,904, Cl. 251-1.00B.

Jones, Michael Edward Benet, to Imperial Chemical Industries Limited. Polysulphones and method of preparation. 4,008,203, Cl. 260-49.000.

Jones, Michael Edward Benet, to Imperial Chemical Industries Limited. Polysulphones as insulators. 4,008,204, Cl. 260-49.000.

Jones, Michael Edward Benet, to Imperial Chemical Industries Limited. Polysulphones as insulators. 4,008,205, Cl. 260-49.000.

Jones, Richard E.: *See—*
Casad, Edward F.; and Jones, Richard E., 4,007,945.

Jonsson, Nils Ake; Merenyl, Ferenc; and Westlund, Lars-Erik, to AB Kabi. 3,3'-Di(sulfonyloxy-group-containing)substituted benzidine derivatives. 4,008,267, Cl. 260-509.000.

Jorn, Raoul; and Lang, Georg, to Jorn, Raoul. Elastic support mount. 4,007,924, Cl. 267-57.10R.

Joyce, Gordon Charles: *See—*
Green, Geoffrey William; Hurle, Donald Thomas James; and Joyce, Gordon Charles, 4,008,387.

Juergens, Eugene H. Wheelchair. 4,007,959, Cl. 297-42.000.

Junghanss, Helmut; Roever, Wilhelm; Neuschutz, Dieter; and Scheffler, Ulrich, to Duisburger Kupferhutte; and Fried. Krupp Gesellschaft mit beschrankter Haftung. Method for processing manganese nodules and recovering the values contained therein. 4,008,076, Cl. 75-101.00R.

Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft: *See—*
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Kabushiki Kaisha Tokyo Keikio: *See—*
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Kabushiki Kaisha Tomoku: *See—*
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Kagata, Tooru, to Aisin Seiki Kabushiki Kaisha. Wheel hub clutch. 4,007,820, Cl. 192-67.00R.

Kahn, Lawrence F.: *See—*
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Kai, Toshio: *See—*
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Kalganov, Vladimir Ioganovich: *See—*
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Kali-Chemie Aktiengesellschaft: *See—*
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Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, to Societe Anonyme dite: L'Oreal. N-monosubstituted indoanilines as dyestuffs for keratinic fibers. 4,007,747, Cl. 132-7.000.

Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, to L'Oreal. Diphenylamines for dyeing keratinic fibers. 4,008,043, Cl. 8-10.200.

Kalopissis, Gregoire; Gascon, Jean; Bugaut, Andree; Gallien, Jacqueline; and Gaston-Breton, Hubert, to Societe Anonyme dite: L'Oreal. N-Thioureido and N-ureido phenylene diamines and method of preparing same. 4,008,272, Cl. 260-552.00R.

Kalthenthaler, Wolfgang: *See—*
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Kaminsky, Daniel, deceased: *See—*
Klutchko, Sylvester; Kaminsky, Daniel, deceased; and von Strandtmann, Maximilian, 4,008,252.

Kaminstein, Bernard. Line winder. 4,007,886, Cl. 242-84.20R.

Kamishita, Takuzo; and Hiraki, Shigeyoshi, to Toko Yakuhin Kogyo Kabushiki Kaisha. Composition for a topical preparation and a process for producing the same. 4,008,321, Cl. 424-243.000.

Kamuro, Yasuo: *See—*
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Kanda, Yasunori, to Fujitsu Ltd. Plural control memory system with multiple micro instruction readout. 4,008,462, Cl. 340-172.500.

Kane, Joseph F. Brick making machine having stripping means. 4,008,034, Cl. 425-441.000.

Kao Soap Co., Ltd.: *See—*
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Kassel, Karl-Heinz: *See—*
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Katayama, Hajime: *See—*
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Kathawala, Faizulla G., to Sandoz, Inc. Tolyloxypivalophenone derivatives. 4,008,327, Cl. 424-278.000.

Kato, Hideo: *See—*
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Kato, Shoichi: *See—*
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Kato, Toshiaki: *See—*
Hinachi, Matatoyo; Oishi, Kazuo; Kato, Toshiaki; Matsui, Takeshi; and Yamada, Takashi, 4,008,473.

Kawagoe, Hiroto, to Hitachi, Ltd. Electronic circuit using field effect transistor with compensation means. 4,008,406, Cl. 307-304.000.

Kawami, Yoji: *See—*
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Kehr, Clifton L., to W. R. Grace & Co. Curable liquid polymer compositions. 4,008,341, Cl. 427-44.000.

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Kellogg, Robert Melroy: *See—*
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Kelsey, Edward A., to Collins, Robert C. Molten metal sampler with vacuum. 4,007,641, Cl. 73-425.600.

Kemira Oy: *See—*
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Key, Jonathan Anthony Henry: *See—*
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Keyes, Melvin H., to Owens-Illinois, Inc. Immobilization of proteins by in-situ polymerization. 4,008,126, Cl. 195-63.000.

Knachikian, Hariton. Homocopter. 4,007,893, Cl. 244-64.000.

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Kirby, William E.; and Duncan, Robert, to Westinghouse Electric Corporation. Constant load probe system for coordinate measurement machines. 4,007,544, Cl. 33-174.00R.

Kircher, Morton S.; and Wood, Judson A., to Olin Corporation. Electrode assembly for an electrolytic cell. 4,008,143, Cl. 204-257.000.

Kirjavainen, Alvi, to Valmet Oy. Beam-deflection compensating structure for headboxes. 4,008,123, Cl. 162-336.000.

Kisaki, Hitoshi: *See—*
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Kitsuda, Toshiyuki; Hattori, Kenichi; Nakagawa, Hiromi; Wakao, Mitsuru; and Matsuda, Tsunehisa, to Japanese National Railways; Kao Soap Co., Ltd.; and Kayabakogyo-Kabushiki-Kaisha. Control method and equipment for charging ready-mixed concrete additives batchwise. 4,008,093, Cl. 106-89.000.

Kitzes, Arnold S.: *See—*
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Kleven, Johnny Hilmer. Metal separating process and apparatus. 4,008,152, Cl. 209-444.000.

Klothe, William M., to Pellon Corporation. Fuse and fold fabric. 4,007,835, Cl. 206-411.000.

Klutchko, Sylvester; Kaminsky, Daniel, deceased (by Kaminsky, Bernice R., administratrix); and von Strandtmann, Maximilian, to Warner-Lambert Company. Substituted-3-formylchromone derivatives. 4,008,252, Cl. 260-340.500.

Knapp, Heinrich, to Robert Bosch G.m.b.H. Fuel injection system. 4,007,722, Cl. 123-139.0AW.

Knapp, Heinrich: *See—*
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Knapp, Randolph H., to Shell Oil Company. Asphalt plug emplacement process. 4,008,096, Cl. 106-277.000.

Knecht, George W., to Midland-Ross Corporation. Electrical connectors. 4,007,976, Cl. 339-14.0RP.

Knieser, James J., to Xerox Corporation. Liquid developer cleaning means. 4,007,983, Cl. 355-15.000.

Knowles, William S.; Sabacky, Milton J.; and Vineyard, Billy D., to Monsanto Company. Asymmetric catalysis. 4,008,281, Cl. 260-606.50P.

Kobayashi, Fumio, to Ohi Manufacturing Co., Ltd. Locking apparatus. 4,007,955, Cl. 292-216.000.

Kobayashi, Makiko: *See—*
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Komori, Shigehiro; Katayama, Hajime; and Suda, Masashi, to Canon Kabushiki Kaisha. Copying apparatus. 4,007,986, Cl. 355-57.000.

Kondo, Hiroyuki: *See—*
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Konicke, Helmut; and Politzer, Anton, to DIEHL. Priming arrangement in a caseless powder charge for small-bore weapons. 4,007,687, Cl. 102-45.000.

Konishiroku Photo Industry Co., Ltd.: *See—*
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Koppel, Gary A., to Eli Lilly and Company. Process for preparing 3-hydroxy cephalosporins. 4,008,230, Cl. 260-243.00C.

Korenowski, Theodore Frank; Penland, Jerry Lee; and Ritzert, Chalmer John, to Dart Industries Inc. Waste treatment of fluoroborate solutions. 4,008,162, Cl. 210-45.000.

Korostoff, Edward; and Zin, Gary K., to Matcon, Inc. Extrusion die. 4,008,035, Cl. 425-461.000.

Koshida, Toshiro; and Nakagawa, Yasuo, to Sumitomo Bakelite Company, Limited. Thermoplastic resin composition. 4,008,295, Cl. 260-876.00R.

Kotani, Haruo; Kunifusa, Toshihiko; and Sasaki, Kazunori, to Horiba, Ltd. Combination pH electrode. 4,008,141, Cl. 204-195.00G.

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Kovacs, Endre; Kovacs, Peter; Kovacs, Michael; Kovacs, Marta; and Kovacs, Geza. Fuel injection pump. 4,008,009, Cl. 417-387.000.

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Koyama, Hiroaki; and Kimura, Isao, to Nippon Kynol Incorporated. Process for producing cured phenolic filaments having improved drawability. 4,008,304, Cl. 264-236.000.

Kramb, Hans, to Bayer Aktiengesellschaft. Sulfonic-acid substituted disazo dyestuffs. 4,008,215, Cl. 260-183.000.

Kramer, Gerald A.: *See—*
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Kramer, Heinz; Peretti, Norbert; and Waschneck, Helmut, to Owens-Illinois, Inc. Apparatus for producing blown hollow glass objects. 4,008,063, Cl. 65-305.000.

Kramer, Manfred: *See—*
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Kraus, Hubert, to Siemens Aktiengesellschaft. Process for the production of an electric stack or layer capacitor. 4,007,520, Cl. 29-25.420.

Krebs, Jacob, to Shatterproof Glass Corporation. Oven door windows. 4,007,727, Cl. 126-200.000.

Krenzer, John, to Velsicol Chemical Corporation. 1-Thiadiazolyl-5-morpholinoimidazolidinones. 4,008,068, Cl. 71-90.000.

Kriegner, Walter: *See—*
Gluck, Maternus; Kriegner, Walter; and Eder, Bernhard, 4,007,556.

Krohberger, Herbert; Burkhardt, Jurgen; and Patzke, Jorg, to Wacker-Chemie GmbH. Process for preparing highly transparent elastomers. 4,008,198, Cl. 260-37.0SB.

Kroplinski, Thaddeus Frank: *See—*
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Kropp, Rudolf, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Alloy powder for the production of dental amalgam. 4,008,073, Cl. 75-.50R.

Kropp, Rudolf: *See—*
Fischer, Adolf, deceased; Kropp, Rudolf; and Reicheneder, Franz, deceased, 4,008,249.

Krosnar, Alena, legal representative: *See—*
Gasson, Edward James; Krosnar, Thomas Charles, deceased; and Marrian, Stanley Frederic, 4,008,179.

Krosnar, Thomas Charles, deceased: *See—*
Gasson, Edward James; Krosnar, Thomas Charles, deceased; and Marrian, Stanley Frederic, 4,008,179.

Krueger, Robert A.: *See—*
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Kryder, Mark Howard, to International Business Machines Corporation. Integrated bubble nucleator. 4,008,463, Cl. 340-174.0TF.

Kube, Wolfgang: *See—*
Wirth, Friedrich; Kube, Wolfgang; Hornberger, Paul; Leman, Otto; Wagner, Joachim; and Karau, Dieter, 4,008,255.

Kubota, Ltd.: *See—*
Yasuoka, Masahiro; and Okada, Yoshitsugu, 4,007,910.

Kudo, Ken-ichi; Kitagawa, Yoshihiko; and Kuribayashi, Hideyuki, to Sumitomo Chemical Company, Limited. Process for producing petroleum resin. 4,008,360, Cl. 526-237.000.

Kuhla, Donald E.: *See—*
Acheson, Richard M.; Stubbs, John K.; Baxter, Charles A. R.; and Kuhla, Donald E., 4,008,245.

Kuhle, Engelbert: *See—*
Siegle, Peter; Kuhle, Engelbert; Hammann, Ingeborg; Behrenz, Wolfgang; and Homeyer, Bernhard, 4,008,328.

Kuhn, Martin C.; Stephens, John A.; Noakes, Michael J.; and Rovig, Allen D., to Anaconda Company, The. Sulfidization reaction. 4,008,072, Cl. 75-1.00R.

Kung, Jo-Fen T.; Clinton, William P.; and Soukup, Robert J., to General Foods Corporation. Method for stabilizing coffee grinder gas aroma. 4,008,340, Cl. 426-651.000.

Kunifusa, Toshihiko: *See—*
Kotani, Haruo; Kunifusa, Toshihiko; and Sasaki, Kazunori, 4,008,141.

Kunstle, Gerhard; and Siegl, Herbert, to Wacker-Chemie GmbH. Process for preparing cobalt(III)acetylacetonate. 4,008,260, Cl. 260-439.00R.

Kunz, Manfred, to Continental Gummi-Werke Aktiengesellschaft. Braking device for sleds for sliding paths. 4,007,692, Cl. 104-134.000.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
Enomoto, Satoru; Mukaida, Yutaka; Yanaka, Mikiro; Nishita, Sadao; Wada, Hisayuki; and Takita, Hitoshi, 4,008,283.

Kuribayashi, Hideyuki: *See—*
Kudo, Ken-ichi; Kitagawa, Yoshihiko; and Kuribayashi, Hideyuki, 4,008,360.

Kurihara, Yasutoshi: *See—*
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Kuriki, Tomio: *See—*
Matsuda, Shogo; Kuriki, Tomio; Ohue, Kazuto; and Okajima, Kunihiko, 4,008,339.

Kurobe, Akira: *See—*
Ikeda, Masao; Miyamoto, Shigeo; Nozawa, Thutomu; Kurobe, Akira; and Futsukaichi, Osamu, 4,008,219.

Kurosaki Refractories Co., Ltd.: *See—*
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Kurozumi, Seizi; Toru, Takeshi; Tanaka, Toshio; Miura, Shuzi; Kobayashi, Makiko; Matsubara, Sadakazu; and Ishimoto, Sachio, to Teijin Limited. New cyclopentene-diols and new acyl esters thereof and process for their preparation. 4,008,125, Cl. 195-51.00R.

Kurth, Harald; Laube, Dieter; and Berthold, Erich, to VEB Wirkmaschinenbau Karl-Marx-Stadt. Cam systems for circular knitting machines. 4,007,608, Cl. 66-40.000.

Kusunoki, Yukio, to Taiyo Package Co. Ltd. Container for card. 4,007,868, Cl. 229-20.000.

Kvavle, Robert Carl; and Awe, William Chester. Method for location and removal of soft tissue in human biopsy operations. 4,007,732, Cl. 128-2.00B.

Kwon, Joon Taek: *See—*
Gelbein, Abraham P.; and Kwon, Joon Taek, 4,008,133.

L. & C. Steinmuller GmbH: *See—*
Clemens, Kurt, 4,007,699.

La Borde, Richard C., to Rood Tool Co. Telephone conversion unit with multiple memory system. 4,008,380, Cl. 179-90.00B.

Lacefield, William B., to Eli Lilly and Company. 3-Amino-5,6-diaryl-1,2,4-triazines. 4,008,232, Cl. 260-247.10M.

Laedtke, Donald O.; and Jackson, Myron W. Apparatus for vacuum precision casting. 4,007,772, Cl. 164-151.000.

Lagasse, Joseph Louis: *See—*
Anderson, Joseph; Lagasse, Joseph Louis; Singh, Satinder; and Milalauskas, Victor, 4,008,447.

Landers, Frank S.: *See—*
Amberg, Stephen W.; and Landers, Frank S., 4,008,347.

Lang, Georg: *See—*
Jorn, Raoul; and Lang, Georg, 4,007,924.

Lang, Gunter: *See—*
Gruber, Wolfgang; Bergmeyer, Hans Ulrich; Nelboeck-Hochstetter, Michael; Beaucamp, Klaus; Holz, Gunter; Gramsall, Johanna; and Lang, Gunter, 4,008,127.

Lang, Paul Wentworth. Color coding and decoding system for use in micrographics. 4,008,482, Cl. 354-104.000.

Langenstein, Max, to Max Langenstein Feld- und Gartengerate. Lawn-edge trimmer with detachable handle. 4,007,526, Cl. 30-276.000.

Langer, Rolf; Thierfelder, Peter; and Geisler, Harald, to VEB Spinnereimaschinenbau. Method for the spinning and twisting of yarn on ring spinning frames and twisting frames. 4,007,581, Cl. 57-156.000.

Langford, Forrest L., to Terminal Data Corporation. Flow camera film transport. 4,007,889, Cl. 242-199.000.

Lanier, Raymond H., to Communications Satellite Corporation (COMSAT). Digital voice switch for single or multiple channel applications. 4,008,375, Cl. 179-1.0VC.

Lanning, George R.; and Chang, John Y. K., to United States of America, Navy. Passive ranging system. 4,008,470, Cl. 343-6.00A.

Laprade, Bernard R.; Laprade, Xavier J.; and Gele, Pierre J. Device for correcting the air/petrol ratio for an internal combustion engine. 4,007,718, Cl. 123-119.00D.

Laprade, Xavier J.: *See—*
Laprade, Bernard R.; Laprade, Xavier J.; and Gele, Pierre J., 4,007,718.

Laridon, Urbain Leopold: *See—*
Lemahieu, Raymond Gerard; and Laridon, Urbain Leopold, 4,008,085.

Larson, Harold A., to Phillips Petroleum Company. Steam supply apparatus. 4,007,518, Cl. 28-1.600.

Lasco, Inc.: *See—*
Pluenneke, Ricks H.; and Dykes, Willis G., 4,007,794.

Latham, Eldon A.: *See—*
Sorensen, Norman E.; and Latham, Eldon A., 4,007,891.

Latta, Bruce M.; and Pensa, Ildo E., to J. P. Stevens & Co., Inc. Treatment of polyester textiles to improve soil release and wettability properties. 4,008,044, Cl. 8-115.500.

Laube, Dieter: *See—*
Kurth, Harald; Laube, Dieter; and Berthold, Erich, 4,007,608.

Laudner, Wilbert. Heating system. 4,007,874, Cl. 237-2.00B.

Laughton, Kenneth. Engine front distributor drive system. 4,007,723, Cl. 123-148.00R.

Laurent, Henry; Wiechert, Rudolf; Mengel, Peter Klaus; and Kolb, Karl-Heinz, to Schering Aktiengesellschaft. Novel corticoids. 4,008,313, Cl. 424-242.000.

Laurent, Henry: *See—*
Annen, Klaus; Hofmeister, Helmut; Laurent, Henry; Kieslich, Klaus; Wendt, Hans; and Mengel, Peter Klaus, 4,008,312.

Leas, Arnold Marcel. Converting solid fuels to gaseous and liquid fuels. 4,008,145, Cl. 208-8.000.

Leathers, Joel F. M.; and Calvin, Donald W., to Dow Chemical Company, The. Method for distilling a ternary azeotrope of fluorosilicic acid, hydrogen fluoride and water. 4,008,130, Cl. 203-6.000.

LeBrun, Robert. Miniature hockey game. 4,007,932, Cl. 273-85.00F.

LeCren, Richard T.: *See—*
Compton, William A.; Duffy, Thomas E.; LeCren, Richard T.; and Shekleton, Jack R., 4,008,039.

Lectron Products, Inc.: *See—*
Quantz, Norman G., 4,008,298.

Lednicer, Daniel; and Nishizawa, Edward E., to Upjohn Company, The. Compositions having inhibited ability to promote platelet aggregation or fibrin clot formation. 4,008,208, Cl. 260-79.30R.

Le Doux, Herbert C. Keyless anti-theft entry system. 4,008,465, Cl. 340-274.00C.

Lee, Pang K.: *See*—
Tiepel, Erich W.; Lee, Pang K.; Kitzes, Arnold S.; and Grover, Donald L., 4,008,171.

Leeds & Northrup Company: *See*—
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LeFevre, Clyde E.: *See*—
Swift, William R.; Marsh, James Michael; and LeFevre, Clyde E., 4,008,483.

Legris, Andre, to Ste Legris France S.A. Multi-way connector for hydraulic conduits. 4,007,951, Cl. 285-137.00R.

Lemahieu, Raymond Gerard; and Laridon, Urbain Leopold, to AGFA-GEVAERT N.V. Photosensitive material containing an organic polyhalogen compound and a dye precursor and the use thereof. 4,008,085, Cl. 96-48.00R.

Leman, Otto: *See*—
Wirth, Friedrich; Kube, Wolfgang; Hornberger, Paul; Leman, Otto; Wagner, Joachim; and Karau, Dieter, 4,008,255.

Lemelson, Jerome H. Multiple magazine transducing apparatus. 4,008,490, Cl. 360-94.000.

Lenhard, Robert Herman: *See*—
Conrow, Ransom Brown; Bernstein, Seymour; and Lenhard, Robert Herman, 4,008,320.

Lenk, Erich: *See*—
Schippers, Heinz; and Lenk, Erich, 4,007,884.

L'Eplattenier, Francois; Vuitel, Laurent; and Pugin, Andre, to Ciba-Geigy Corporation. Process for the manufacture of bis-azomethine metal complex colorants. 4,008,225, Cl. 260-240.00G.

Lerner, Julius; and Mayer, Robert, to Sun Oil Company of Pennsylvania. Component injection system. 4,007,755, Cl. 137-101.210.

Leroy, Jean Marie Louis: *See*—
Brouard, Claude Marie Henri Emile; Leroy, Jean Marie Louis; and Stiot, Jean-Pierre Henri, 4,008,213.

Lesher, George Y.; and Singh, Baldev, to Sterling Drug Inc. N-[2-(pyridinyl)-4-pyrimidinyl]ureas. 4,008,235, Cl. 260-256.40N.

Letat Francais represente par le Ministre des Postes et Telecommunications: *See*—
Aubin, Gerard; Braguier, Michel Arsene; Naturel, Christian; Poulin, Etienne M.; and Wattre, Joseph A., 4,007,969.

Lettau, Dieter: *See*—
Hacker, Dieter; Jager, Rolf; and Lettau, Dieter, 4,008,453.

Leuchs, Ottmar, to Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft. Electrical conductor having inhibited polymer compositions. 4,008,368, Cl. 174-120.00R.

Licentia Patent-Verwaltungs-G.m.b.H.: *See*—
Beschoner, Hans-Hermann; Dulken, Hartmut; Guder, Gottfried; and Kassel, Karl-Heinz, 4,008,082.

Lichowsky, Abraham, to Ambitex Corporation; and Cendev Corporation. Beverage heat maintaining apparatus. 4,007,674, Cl. 99-281.000.

Lienhard, Paul; Beffa, Fabio; and Soiron, Charles, to Ciba-Geigy AG. Betainic azo dyestuffs containing cobalt in complex union with a colorless, tridentate ligand. 4,008,211, Cl. 260-147.000.

Lin, Teng Ke. Commode flushing control apparatus. 4,007,499, Cl. 4-249.000.

Linde Aktiengesellschaft: *See*—
Dorner, Armin, 4,008,128.

Linder, Ernst: *See*—
Neidhard, Horst; Linder, Ernst; Wahl, Josef; Schmidt, Peter Jurgen; and Schoeck, Peter A., 4,007,589.

Lindsey, Clifford P., to Midwestern Manufacturing Company. Machine for wrapping tape on a pipe including improved means of controlling the tension on the tape. 4,008,114, Cl. 156-392.000.

Lindstrom, Olle Birger. Chemoelectric battery. 4,008,099, Cl. 429-59.000.

Linear International Corporation: *See*—
Brimer, Claude Morris, 4,007,612.

Linford, John Robert: *See*—
Nash, Harold Garth; Schriber, Gene Arnold; and Linford, John Robert, 4,008,373.

Linstead, Lorraine A. Hand knitting apparatus. 4,007,610, Cl. 66-117.000.

Lock, George A.; and Hoyer, Wilmer A., to Exxon Production Research Company. Method for determining fluid type and lithology of subterranean formations. 4,008,392, Cl. 250-270.000.

Lockheed Aircraft Corporation: *See*—
Tyree, Gerald W., 4,007,540.

Loctite Corporation: *See*—
Haviland, Girard S., 4,007,704.

Loebel, Wolf: *See*—
Gradl, Ottmar; Loebel, Wolf; Rossmann, Axel; Zech, Herbert; and Zahring, Gerhard, 4,008,000.

Loest, Kent W.; and Ewing, Vernon R., to Southwire Company; National Steel Corporation; and Earth Sciences, Inc. Production of monobasic potassium phosphate by ion exchange. 4,008,307, Cl. 423-120.000.

Loomba, Yogendra Singh: *See*—
Stephenson, Robert Larry; Loomba, Yogendra Singh; and Fox, William Robert, 4,007,948.

L'Oreal: *See*—
Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, 4,008,043.

Lotmar, Walter: *See*—
Bracher, Daniel; and Lotmar, Walter, 4,007,980.

Loyer, Phillip K., to Picker Corporation. Tire inspection system. 4,008,396, Cl. 250-358.00T.

Lubbers, Henning, to Hoechst Aktiengesellschaft. Process for the preparation of aromatic thiocarboxylic acid amides. 4,008,264, Cl. 260-470.000.

Lubbers, LeRoy; Stubbs, William K.; and Zollinger, Howard A., to Rapistan, Incorporated. Multi-aisle warehouse system with mobile lift having control means for an article transfer vehicle. 4,007,843, Cl. 214-16.40B.

Luckey, William A. Rafter vent. 4,007,672, Cl. 98-37.000.

Ludwig Merckle KG: *See*—
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Lummus Company, The: *See*—
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Gelbein, Abraham P.; Paustian, John E.; and Sze, Morgan C., 4,008,241.

Luthi, Christian, to Ciba-Geigy Corporation. Optically brightening with a synergistic mixture. 4,008,166, Cl. 252-89.00B.

Lynott, John J.; and Storm, Elwood H., to International Business Machines Corporation. Fixed head, direct access storage device. 4,008,491, Cl. 360-97.000.

Lyon, John Jeffrey: *See*—
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M.G.B., Inc.: *See*—
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M. Scaglia S.p.A.: *See*—
Scaglia, Enzo, 4,007,888.

Machacek, Oldrich, to Atlas Powder Company. Water gel explosives. 4,008,110, Cl. 149-46.000.

Machatzke, Heinz, to Bayer Aktiengesellschaft. Anthraquinone dyestuffs. 4,008,222, Cl. 260-239.30T.

Maci, Raymond James, to Wallace-Murray Corporation. Fan drive fluid circulation apparatus. 4,007,819, Cl. 192-58.00B.

Mackrle, Svatopluk; Mackrle, Vladmir; and Dracka, Oldrich, to Agrotechnika, narodny podnik. Reactor for purification of water by fluid filtration. 4,008,153, Cl. 210-208.000.

Mackrle, Vladmir: *See*—
Mackrle, Svatopluk; Mackrle, Vladmir; and Dracka, Oldrich, 4,008,153.

MacLean, Donald John, Jr.: *See*—
Flanagan, James Loton; MacLean, Donald John, Jr.; and West, James Edward, 4,008,376.

MacLeay, Ronald Edward; and Sheppard, Chester Stephen, to Pennwalt Corporation. Tertiary alkyl semicarbazides and their method of preparation. 4,008,273, Cl. 260-554.000.

Maddox, Jim, Jr.; and Tate, Jack F., to Texaco Inc. Surfactant oil recovery process usable in high temperature formations having high concentrations of polyvalent ions. 4,008,165, Cl. 252-8.55D.

Maeda, Kuniyasu: *See*—
Hirono, Yoshihiko; Ishikawa, Hisao; Iwataki, Isao; Sawaki, Mikio; Okabe, Takashi; Takiguchi, Daigaku; and Maeda, Kuniyasu, 4,008,067.

Maekawa, Shunichi; and Kisaki, Hitoshi, to Fujitsu Ltd. Semiconductor device having multilayered electrode structure. 4,008,484, Cl. 357-36.000.

Magara, Osamu: *See*—
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Mod, Robert R.; Harris, James A.; Arthur, Jett C., Jr.; Magne, Frank C.; Sumrell, Mene; and Novak, Arthur F., 4,008,137.

Magnotta, Frank A.: *See*—
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Magnusson, Bengt Uno Gunnar, to Svedia Dental-Industri AB. Cervical dilation vibrator. 4,007,735, Cl. 128-37.000.

Magrath, Joseph M.: *See*—
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Mancini, Angelo J.; and Galloway, Ronald W. Christmas tree stand. 4,007,901, Cl. 248-526.000.

Mangeot, Georges: *See*—
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Mansfield, Peter W.: *See*—
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Maples, Billy G. Gardening tool. 4,007,916, Cl. 254-132.000.

Marans, Nelson S.; Ferington, Thomas E.; and Messina, Philip, to W. R. Grace & Co. Thickened polyester composition containing ultrafine polypropylene fibers. 4,008,294, Cl. 260-862.000.

Marchello, Maurice J.; and Bassett, Gordon H., to United States Gypsum Company. Panel attachment system. 4,007,571, Cl. 52-483.000.

Marco, George P., to Allis-Chalmers Corporation. Interlock arrangement for use with sideloader fork lift truck. 4,007,847, Cl. 214-670.000.

Marino, Michael J.: *See*—
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Mark Systems, Inc.: *See*—
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Marklein, William R.: *See*—
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Marrian, Stanley Frederic: *See*—
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Martin Industries, Inc.: *See*—
Kenchel, Thomas F., 4,007,726.

Martin, William A.: *See—*
Schuetz, James W.; and Martin, William A., 4,007,655.
Martin, William R.; and Nystrom, Stewart W., to Sun Oil Company of Pennsylvania. Pressure stabilizer for hydrocarbon storage facilities. 4,007,759, Cl. 137-550.000.
Marz, Louis R.: *See—*
Maxwell, Richard D.; Pink, John J.; Fitzharris, Michael J.; and Marz, Louis R., 4,007,602.
Maska, Rudolf; and Hart, Donald P., to PPG Industries, Inc. Crosslinkable coating compositions and method of using the same. 4,008,293, Cl. 260-856.000.
Masoero, Marcella: *See—*
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Massey-Ferguson Inc.: *See—*
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Masters, Richard M. Heat exchange system. 4,007,781, Cl. 165-46.000.
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Matcon, Inc.: *See—*
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Matranga, Eve; and Hokama, Yosh, to Eve-N-Tips Industries. Fingernail extension. 4,007,748, Cl. 132-73.000.
Matsubara, Isamu, to Yoshida Kogyo Kabushiki Kaisha. Prefabricated fence. 4,007,918, Cl. 256-59.000.
Matsubara, Sadakazu: *See—*
Kurozumi, Seizi; Toru, Takeshi; Tanaka, Toshio; Miura, Shuzi; Kobayashi, Makiko; Matsubara, Sadakazu; and Ishimoto, Sachio, 4,008,125.
Matsuda, Kazuo; Ohmura, Hidemasa; and Niimi, Yukihisa, to Kao Soap Co., Ltd. Process for preparation of amphoteric resinous aqueous emulsions. 4,008,196, Cl. 260-29.2TN.
Matsuda, Shogo; Kuriki, Tomio; Ohue, Kazuto; and Okajima, Kunihiko, to Asahi Kasei Kogyo Kabushiki Kaisha. Process for removing polyphenols in vegetable beverages. 4,008,339, Cl. 426-330.400.
Matsuda, Tsunehisa: *See—*
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Matsui, Takeshi: *See—*
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Matsushima, Ryuzo, to Yuugen Kaisha Matsushima Seisakusho. Tightening device for threaded screw part. 4,007,768, Cl. 145-50.00D.
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Matsushita, Yoshihiro: *See—*
Ochiai, Michihiko; Morimoto, Akira; Matsushita, Yoshihiro; and Okada, Taiiti, 4,008,246.
Matsushita, Yukio. Vibration sensing and responding device. 4,007,643, Cl. 74-2.000.
Matthews, Ernest L.; and Matthews, Ralph E., to Matthews Machine Company, Inc. Apparatus for packaging fluid materials in packets. 4,007,577, Cl. 53-180.00R.
Matthews Machine Company, Inc.: *See—*
Matthews, Ernest L.; and Matthews, Ralph E., 4,007,577.
Matthews, Michael Robert, to Post Office, The. Method of making an optical waveguide coupler. 4,008,112, Cl. 156-644.000.
Matthews, Ralph E.: *See—*
Matthews, Ernest L.; and Matthews, Ralph E., 4,007,577.
Mattila, Tapio: *See—*
Renvall, Ilkka; and Mattila, Tapio, 4,008,256.
Mattos, David W. Modular conveyor. 4,007,827, Cl. 198-862.000.
Mattson, Rodney A.: *See—*
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Matusch, Siegfried: *See—*
Dietzel, Walter; Matusch, Siegfried; Schaper, Helmut; and Zeichner, Erwin, 4,008,098.
Maurer, Bruno; Fracheboud, Michel G.; and Ohloff, Gunther, to Firmenich S.A. 6,10 Dimethyl bicyclo(4,4,0)decane or decene alcohol and ester perfume compositions. 4,008,184, Cl. 252-522.000.
Mauvernay, Roland-Yves; Busch, Norbert; Moleyre, Jacques; Simons, Jacques; and Monteil, Andre, to Societe Anonyme dite: Centre Europen de Recherches Mauvernay (C.E.R.M.). Substituted cyclohexanes, pharmaceutical compositions containing them and method of treatment involving their use. 4,008,329, Cl. 424-330.000.
Max Langenstein Feld- und Gartengerate: *See—*
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Maxon Industries, Inc.: *See—*
Perkins, William V., 4,007,844.
Maxwell, Clifford J.: *See—*
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Maxwell, Richard D.; Pink, John J.; Fitzharris, Michael J.; and Marz, Louis R., to Amana Refrigeration, Inc. Exterior ice service for freezer-refrigerators. 4,007,602, Cl. 62-137.000.
Mayer, Edward F.: *See—*
Buchan, W. Raymond; and Mayer, Edward F., 4,007,707.
Mayer, Robert: *See—*
Lerner, Julius; and Mayer, Robert, 4,007,755.
Mayled, Edward. Container and closure. 4,007,828, Cl. 206-1.500.
McClay, Alexander W., Jr. Multiple gauging device for modified ship-lap corner seams. 4,007,543, Cl. 33-137.00R.
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Navratil, Franz, to Siemens Aktiengesellschaft. Switchable high-frequency magnetic rotary fields. 4,008,420, Cl. 361-153.000.

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Nijhuis, Jan, to Hollandse Signaalapparaten B.V. Method for the manufacture of twistless or substantially twistless yarn and yarn whenever manufactured by the application of this method. 4,007,580, Cl. 57-140.0BY.

Nimylowycz, Osyp, to United States of America, Army. Gas generator. 4,007,685, Cl. 102-39.000.

Nippon Electric Company, Ltd.: *See*—
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Nippon Zeon Co., Ltd.: *See*—
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Nippondenso Co., Ltd.: *See*—
Sugiura, Akio; Okamoto, Atutoshi; Nogami, Takahiro; and Ohta, Jun, 4,007,971.

Nirasawa, Tomiji; and Ota, Hiroshi, to Kabushiki Kaisha Tokyo Keikio. Marine radar transmission and reception system. 4,008,472, Cl. 343-7.00A.

Nishihara, Yasuhiro: *See*—
Abe, Toshizo; Sakamoto, Seiho; Nishihara, Yasuhiro; and Saruwatari, Hidetoshi, 4,008,358.

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Nishikori, Tuneharu; Mori, Tetsu; Kobayashi, Yasuo; and Hiyama,

Kenjiro, to Asahi Glass Co., Ltd. Apparatus for detecting the position of float glass. 4,008,062, Cl. 65-158.000.

Nishimura, Hajime; and Toda, Mitsuhisa, to Citizen Watch Co., Ltd. Beryllium battery. 4,008,357, Cl. 429-142.000.

Nishimura, Masaaki: *See—*
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Nishio, Shinji, to NGK Spark Plug Co., Ltd. Method of clamping a lattice-like ceramic structure body. 4,007,539, Cl. 29-455.00R.

Nishita, Sadao: *See—*
Enomoto, Satoru; Mukaida, Yutaka; Yanaka, Mikiro; Nishita, Sadao; Wada, Hiszyuki; and Takita, Hitoshi, 4,008,283.

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Nissan Motor Co., Ltd.: *See—*
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Nitto Electric Industrial Co., Ltd.: *See—*
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Noble, Donald William: *See—*
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Nobles, Eugene R., Jr. Heated stethoscope. 4,007,806, Cl. 181-131.000.

Noda, Banda, to Nippon Seiko K.K. Device for detecting damage on rotators. 4,007,630, Cl. 73-71.400.

Noda, Hideo: *See—*
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Noguchi, Hiroshi: *See—*
Tobiki, Hisao; Yamada, Hirotada; Nakatsuka, Iwao; Shimago, Kozo; Okano, Shigeru; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; and Eda, Yasuko, 4,008,220.

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Norcia, John A.; and Bickar, Raymond E. Vehicle wheel loading bar and mounting arrangement. 4,007,949, Cl. 280-767.000.

Nordisk Kartro Aktiebolag: *See—*
Borgersen, Egil, 4,007,834.

Norris, Oscar L. Pickup truck spare tire, jack and lug wrench holder. 4,007,863, Cl. 224-42.240.

Norris, William P.: *See—*
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North Star Research Institute: *See—*
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Bonnell, Robert Peter; and Northey, Arthur Douglas, 4,007,715.

Norton, Gerard, to Chemincon Incorporated. Shaped heat insulating articles. 4,008,109, Cl. 149-37.000.

Nortron Corporation: *See—*
Jackson, Bernie F., 4,007,642.

Nossum, Knut. Key controlled pick resistant lock. 4,007,615, Cl. 70-387.000.

Novak, Arthur F.: *See—*
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Nowatzki, James A., to United States of America, Navy. Flexible stabilizer for underwater vehicle. 4,007,505, Cl. 9-8.00R.

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Nybo, Reidar Oivind; and Eik, Geir, to Finn Tveten & Co. A/S; and A/S Akers Mek. Verksted. Parking device for blowout preventer. 4,007,782, Cl. 166-79.000.

Nystrom, Stewart W.: *See—*
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Obayashi, Takashi: *See—*
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Ochi, Shikanosuke, to Kabushiki Kaisha Sega Enterprises. Apparatus for simulating recoil in an imitation gun. 4,007,934, Cl. 273-101.200.

Ochiai, Michihiko; Aki, Osami; Morimoto, Akira; and Okada, Taiiti, to Takeda Chemical Industries, Ltd. Cephalosporins. 4,008,227, Cl. 260-243.00C.

Ochiai, Michihiko; Morimoto, Akira; Matsushita, Yoshihiro; and Okada, Taiiti, to Takeda Chemical Industries, Ltd. Aminothiazole derivatives. 4,008,246, Cl. 260-306.80R.

Ochiai, Tatsushiro: *See—*
Sugisaki, Takao; Ochiai, Tatsushiro; Nishikawa, Kyoichi; and Higurashi, Minoru, 4,008,432.

Oda, Satoshi: *See—*
Sawatari, Kenichi; Mukai, Toshihiko; Oda, Satoshi; Akashi, Hiroyuki; and Kohara, Masanori, 4,008,274.

Odhner, Oliver R. Blackboard eraser. 4,007,509, Cl. 15-159.00A.

Oesterlin, Rudolf: *See—*
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Ohgushi, Koji: *See—*
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Ohi Manufacturing Co., Ltd.: *See—*
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Okamoto, Miyoshi; Watanabe, Koji; Izumi, Zenji; Aya, Toshihiko; and Kitagawa, Hideaki, to Toray Industries, Inc. Multi-component fiber, the method for making said and polyurethane matrix sheets formed from said. 4,008,344, Cl. 427-307.000.

Okamura Co., Ltd.: *See—*
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Okano, Masami; Sadamura, Morito; Iwasaki, Muraichi; Suzuki, Takeshi; Utunomiya, Yasushi; Yajima, Yoshihiro; Yamauchi, Yozi; and Terawaki, Yutaka, to Okano Valve Seizo Kabushiki Kaisha. Device for automatically lapping valve seat. 4,007,561, Cl. 51-241.0VS.

Okano, Shigeru: *See—*
Tobiki, Hisao; Yamada, Hirotada; Nakatsuka, Iwao; Shimago, Kozo; Okano, Shigeru; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; and Eda, Yasuko, 4,008,220.

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O'Keeffe, Terrence W.; and Simon, Alan J., to Westinghouse Electric Corporation. Method and apparatus for electron beam alignment with a member by detecting X-rays. 4,008,402, Cl. 250-492.00A.

Okitsu, Hiroyuki: *See—*
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Oland Industries Limited: *See—*
Oland, John Hugh, 4,007,512.

Oland, John Hugh, to Oland Industries Limited. Retractable luggage roller assembly. 4,007,512, Cl. 16-19.000.

Oleson, Sumner R. Sawing apparatus of the pulpwood slasher type. 4,007,654, Cl. 83-155.000.

Olin Corporation: *See—*
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van Leuwen, Bruce G.; and Maxwell, Clifford J., 4,008,189.

Olstowski, Franciszek, to Dow Chemical Company, The. Process for preparing rapid-setting polyurethanes. 4,008,185, Cl. 260-2.5AC.

Omark Industries, Inc.: *See—*
Borstel, Eugene C., Jr., 4,007,578.

Omoto, Yorihiko; and Matsunaga, Teruo, to Teijin Limited. Process for preparing polyesters for opaque film use. 4,008,207, Cl. 260-75.00R.

Ono, Hiroomi, to Takeda Chemical Industries, Ltd. Composition for controlling sexual behavior of mammals. 4,008,311, Cl. 424-240.000.

Ontario Research Foundation: *See—*
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Ooyachi, Akio, to Watanabe, Hiroshi. Manual floor sweeper. 4,007,508, Cl. 15-42.000.

Orlov, Gennady Ivanovich: *See—*
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Orwin, Olaf John Barclay, to Gib Precision Limited. New or improved torque limiting clutch. 4,007,818, Cl. 192-56.00R.

Orzel, Edward S., to Weatherhead Company, The. Brake booster with improved pedal feel characteristics. 4,007,665, Cl. 91-391.00R.

Osborne, George T., to Braemar Computer Devices, Inc. Magnetic recording data decoding system. 4,008,488, Cl. 360-51.000.

Oscar Mayer & Co. Inc.: *See—*
Seipel, Thomas E., 4,007,841.

Oshima, Toshio; and Ishiguro, Tatsuo, to Nippon Electric Company, Ltd. Delta modulation encoder. 4,008,435, Cl. 325-38.00B.

Osterreichisch-Amerkianische Magnesit Aktiengesellschaft: *See—*
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Otis Engineering Corporation: *See—*
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Gazda, Imre I., 4,007,798.

Ottaway, Herbert J. Mobile amusement ride. 4,007,926, Cl. 272-37.000.

Otto Boch Orthopadische Industries KG: *See—*
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Outboard Marine Corporation: *See—*
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Owen, Robert A., to Illinois Tool Works Inc. Cannula cover. 4,007,740, Cl. 128-221.000.

Owens-Illinois, Inc.: *See—*
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Keyes, Melvin H., 4,008,126.
Kramer, Heinz; Peretti, Norbert; and Waschneck, Helmut, 4,008,063.

Ozawa, Yasuhiko, to Mitsubishi Denki Kabushiki Kaisha. Control for elevator. 4,007,811, Cl. 187-29.00R.

P. R. Mallory & Co., Inc.: *See—*
Fitchman, Arthur; and Wyatt, Terry Doug, 4,008,354.

Pabst, Manfred: *See—*
Houben, Heinz; and Pabst, Manfred, 4,007,625.

Page, Victor John. Double-acting pump. 4,008,012, Cl. 417-454.000.

Paget, Charles J.; and Wikel, James H., to Eli Lilly and Company. Process for the preparation of s-triazolo[3,4-b]benzothiazoles. 4,008,242, Cl. 260-305.000.

Paget, Charles J.: *See—*
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Pahl, Karl-Heinz. Device for the cyclic manufacture of molded parts. 4,008,032, Cl. 425-246.000.

Pak-It Mgf Co., Inc.: *See—*
Campbell, Sterrett P., 4,008,025.

Paluch, Bernard R. Anesthesia breathing system. 4,007,737, Cl. 128-188.000.

Pansini, Andrew L. Automatic pool cleaner system with timer device. 4,007,749, Cl. 134-56.00R.

Panusch, Erwin: *See—*
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Pape, Wilhelm: *See—*
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Park, Anthony John; and Weeks, Brian, to British Petroleum Company Limited, The. Removal of residual vinyl halide monomer from vinyl halide polymers by radio frequency dielectric heating. 4,008,361, Cl. 528-503.000.

Parsons, Alfred H. Selection and retrieval system. 4,007,840, Cl. 209-80.500.

Pattantyus-Abraham, Tamas I.; and Whyte, Ian A., to Westinghouse Electric Corporation. Power line carrier communication system having efficient carrier signal coupling of distribution secondary lines. 4,008,467, Cl. 340-310.00A.

Pattyn, Herman Alberik; Vanassche, Willy Joseph; and De brabandere, Luc Achiel, to AGFA-GEVAERT N.V. Direct-positive silver halide emulsion reduction and gold fogged in contact with a palladium compound. 4,008,089, Cl. 96-108.000.

Patzke, Jorg: *See—*
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Paul Forkardt Kommanditgesellschaft: *See—*
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Paull, Seymour; and Marino, Michael J., to Roi Corporation. Electronic thermometer. 4,007,832, Cl. 206-306.000.

Paustian, John E.: *See—*
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Payne, Peter R. Inertial escape system. 4,007,895, Cl. 244-138.00R.

Pearson, Raymond H. Toilet ventilator including overflow-responsive sensor. 4,007,498, Cl. 4-213.000.

Pedersen, Herbert N., to Westinghouse Electric Corporation. Method of making self-calibrated displacement measurements. 4,008,455, Cl. 340-1.00R.

Pedersen, Raymond J.: *See—*
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Peifer, Gary S.; and Shulke, David D., to Caterpillar Tractor Co. Pivoted window for cab of motor vehicle. 4,007,958, Cl. 296-28.00C.

Pellon Corporation: *See—*
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Penland, Jerry Lee: *See—*
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Pensa, Ildo E.: *See—*
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Perego, Giuseppe, to Perego-Pines S.p.A. Baby carriage foldable in width and shortenable in height also having the seat-back inclinable in various positions. 4,007,947, Cl. 280-642.000.

Perego-Pines S.p.A.: *See—*
Perego, Giuseppe, 4,007,947.

Peretti, Norbert: *See—*
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Perkams, Wilhelm, to AS-Motor GmbH KG. Storage battery with common expansion and filler chamber. 4,008,355, Cl. 429-63.000.

Perkins, William V., to Maxon Industries, Inc. Self folding platform. 4,007,844, Cl. 214-75.00T.

Personal Communications, Inc.: *See—*
Yevick, George Johannus, 4,007,985.

Perun, Thomas John; Rasmussen, Ronald Robert; and Horrom, Bruce Wayne, to Abbott Laboratories. 2,4-Diamino-5-benzylpyrimidines. 4,008,236, Cl. 260-256.40N.

Peter, Heinz: *See—*
Schutz, Karl-Heinz; and Peter, Heinz, 4,007,975.

Peters, Rudoiph W. Blood pressure indicator. 4,007,734, Cl. 128-2.05G.

Petersen, Robert J., to North Star Research Institute. Blood compatible polymers for blood oxygenation devices. 4,008,047, Cl. 23-258.50M.

Petersson, Stig Arvid, to Boliden Aktiebolag. Autogenous smelting of lead in a top blown rotary converter. 4,008,075, Cl. 75-77.000.

Petrie, John David. Method of constructing a structural member. 4,007,538, Cl. 29-447.000.

Petrohilos, Harry G.; and Taylor, Francis M., to Techmet Company; and Systems Research Laboratories, Inc. Light beam shape control in optical measuring apparatus. 4,007,992, Cl. 356-160.000.

Pettee, Gary K. Fishing rod holder. 4,007,902, Cl. 248-534.000.

Pettibone, Raymond B.: *See—*
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Bass, Robert J.; Koch, Richard C.; Richards, Hugh C.; and Thorpe, John E., 4,008,325.

Pfleger, Frank G.; and Howland, Howard. Gravure printing cylinders. 4,007,680, Cl. 101-153.000.

Phaal, Cornelius. Abrasive wheel containing nickel coated needle-shaped cubic boron nitride particles. 4,008,055, Cl. 51-298.00R.

Phalan, James M., to Intel Corporation. Voltage translator for solid state watch. 4,008,429, Cl. 323-17.000.

Philadelphia Quartz Company: *See—*
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Philippi, Ernst-Helmut; Pokorny, Helmut; and Mumme, Wolfgang, to Veba-Chemie AG. Process for reducing nitrogen oxide losses from certain slurries and solutions by the addition of phosphate salts. 4,008,315, Cl. 423-319.000.

Phillips, Harry: *See—*
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Phillips Petroleum Company: *See—*
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Cottle, John E., 4,007,787.
James, John P., 4,008,292.
Larson, Harold A., 4,007,518.
Meister, John J., 4,007,792.
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Loyer, Phillip K., 4,008,396.
Piepers, Gijsbrecht Gerhardus; and Scholtus, Christiaan Gustaaf Adolf, to Reactor Centrum Nederland. Lattice construction. 4,007,899, Cl. 248-49.000.
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Frolov, Jury Fedorovich; Naryshkin, Jury Anatolievich; Cherednichenko, Vladimir Semenovich; Piljukov, Jury Fedorovich; Orlov, Gennady Ivanovich; Mikulinsky, Aron Semenovich; Suturin, Serafim Nikolaevich; Slobodkin, Leonid Vladimirovich; and Dashkov, Konstantin Stepanovich, 4,008,364.
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Maxwell, Richard D.; Pink, John J.; Fitzharris, Michael J.; and Marz, Louis R., 4,007,602.
Pinkerton, Harry E. Valveless positive displacement pump. 4,008,003, Cl. 417-250.000.
Pino, Giovanni: *See—*
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Pioneer Electronic Corporation: *See—*
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Pitney-Bowes, Inc.: *See—*
Beck, Christian A.; and Hubbard, David W., 4,007,984.
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Pitts, Warren R.: *See—*
Fairbanks, Daniel F.; Magnotta, Frank A.; and Pitts, Warren R., 4,008,115.
Pizzuto, John N. Magnetic head structure with minimum feedthrough. 4,008,493, Cl. 360-124.000.
Pluenneke, Ricks H.; and Dykes, Willis G., to Lasco, Inc. Top desiccation of crop plants. 4,007,794, Cl. 171-1.000.
Plunguian, Mark; and Cornwell, Charles E. Mixing and aerating device. 4,007,920, Cl. 259-108.000.
Pneumo Corporation: *See—*
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Pochop, Merle E.: *See—*
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Pogwizd, Kenneth W. Ladder stabilizer. 4,007,807, Cl. 182-109.000.
Pokorny, Helmut: *See—*
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Polk, James K. Apparatus for forming a piping bead. 4,008,027, Cl. 425-127.000.
Pomper, Seymour: *See—*
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Ponn, Timothy R., to A & P Products Incorporated. Multi-conductor element and method of making same. 4,008,300, Cl. 264-104.000.
Ponter, Robert J., to Ritter Engineering Company. Retrofit method and apparatus for rolling mills. 4,007,618, Cl. 72-245.000.
Popoff, Ivan Christoff; and Haines, Paul Gordon, to Pennwalt Corporation. Oxazolidine and thiazolidine carbodithioates. 4,008,244, Cl. 260-306.70R.
Popp, Roger C., to Midland-Ross Corporation. Hydraulic booster. 4,007,664, Cl. 91-49.000.
Porucznik, Paul: *See—*
Franek, Jozef Tadeusz; and Porucznik, Paul, 4,007,621.
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Poulin, Etienne M.: *See—*
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Powell, Leslie Vernon; and Edwards, Reginald Harold, to Dunlop Holdings Limited. Tire and wheel assemblies. 4,007,769, Cl. 152-330.0RF.
Powell, Lloyd James, to International Telephone and Telegraph Corporation. Removable captive coupling nut assembly. 4,007,953, Cl. 285-321.000.
Power Saver Corporation: *See—*
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Price, Jerry L., to Monsanto Company. Purification of acetic acid. 4,008,131, Cl. 203-82.000.
Prill, LeRoy, to Prill Manufacturing Company. Stoker actuated coal burning apparatus. 4,007,697, Cl. 110-45.000.
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Proctor, Richard I. Inertial cycle exerciser. 4,007,927, Cl. 272-73.000.
Projectus Industriprodukter AB: *See—*
Gustafsson, Berth Ulrik, 4,007,603.
Pugin, Andre: *See—*
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Pullman Incorporated: *See—*
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Pulp and Paper Research Institute of Canada: *See—*
Wong, Alfred; Prahacs, Steven; and Dorica, Joseph, 4,008,161.
Puskas, Imre; and Cengel, John A., to Standard Oil Company (Indiana). Polybutene composition containing halogen-containing additives and use thereof. 4,008,168, Cl. 252-182.000.
Pye, Donald George, to Du Pont de Nemours, E. I., and Company. Stabilization of color images formed by photomodulation of the Christiansen effect. 4,008,083, Cl. 96-27.00R.
Quantz, Norman G., to Lectron Products, Inc. Carburetor. 4,008,298, Cl. 261-44.00R.
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Rabl, Ari: *See—*
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Radke, Dietrich: *See—*
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Ramsay, Melvin M., to International Standard Electric Corporation. Method of making optical fiber optical power divider. 4,008,061, Cl. 65-4.00A.
Ramsey, Francis E.: *See—*
Bladow, Arnold A.; and Ramsey, Francis E., 4,008,337.
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Randol, Glenn Talley. Drum-type service and emergency brake. 4,007,813, Cl. 188-76.000.
Rapistan, Incorporated: *See—*
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Rapkin, Edward, to Intertechnique S.A. System and method of liquid scintillation counting. 4,008,393, Cl. 250-328.000.
Rasmussen, Philip A. Swim fin. 4,007,506, Cl. 9-309.000.
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Rau Fastener, a division of U.S. Industries, Inc.: *See—*
Silverbush, Herbert M.; and Jensen, Philip B., 4,007,537.
Rausch, Richard E., to Universal Oil Products Company. Dehydrogenation method and multimetallic catalytic composite for use therein. 4,008,180, Cl. 252-439.000.
Raven, Manfred V., to Siemens Aktiengesellschaft. Apparatus for correcting and adding data to that taken from a mechanical data carrier. 4,008,461, Cl. 340-172.500.
Rax Works, Inc.: *See—*
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Raymond Lee Organization, Inc., The: *See—*
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De Rosa, Richard P., 4,008,382.
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Schade, Otto Heinrich, Jr., 4,008,441.
Re, Luciano; and Zappelli, Piergiorgio, to Snam Progetti S.p.A. Process for the preparation of adenine derivatives made functional and products obtained therefrom. 4,008,363, Cl. 536-28.000.
Reactor Centrum Nederland: *See—*
Piepers, Gijsbrecht Gerhardus; and Scholtus, Christiaan Gustaaf Adolf, 4,007,899.
Reber, Rufus K., to United States of America, Navy. Cavity producing underwater sound source. 4,007,805, Cl. 181-120.000.
Recherche et Industrie Therapeutiques (R.I.T.): *See—*
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Reicheneder, Dora Irmgard, heiress-at-law: *See—*
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Reiter, Ralph H.: *See—*
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Remy, Joel, to Adret Electronic. Quaternary frequency synthesizer. 4,008,443, Cl. 331-38.000.
Renfrew, Edgar E., to American Color & Chemical Corporation. Monoazo dye mixtures derived from 7-amino-4-nitrobenzotriazole and bis-hydroxyalkylamino acylanilides reacted with acid halides and amides. 4,008,212, Cl. 260-157.000.
Renfrew, Edgar Earl; and Genta, Guido Ruggiero Lorenzo, to American Color & Chemical Corporation. α-(N-alkyl-4-formylanilino)-toluenesulfonamides. 4,008,262, Cl. 260-465.00E.
Renvall, Ilkka; and Mattila, Tapio, to Kemira Oy. Esterification of furfuryl alcohol and its derivates. 4,008,256, Cl. 260-347.400.
Reynolds, Collins J., III. Upwardly extendible wing flap system. 4,007,896, Cl. 244-42.00D.
Rhone-Poulenc-Textile: *See—*
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Isoard, Bernard, 4,007,883.
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Riblet, Gordon, to Microwave Development Laboratories, Inc. Apparatus for making unitary casing. 4,007,903, Cl. 249-145.000.
Rice, Charles H.: *See—*
Clancey, James T.; Gorin, Everett; Reichl, Eric H.; and Rice, Charles H., 4,008,054.
Rice, Charles M., to Akzona Incorporated. Indicating device for yarn crimping wheel teeth spacing adjustment. 4,007,519, Cl. 28-1.800.
Richards, Hugh C.: *See—*
Bass, Robert J.; Koch, Richard C.; Richards, Hugh C.; and Thorpe, John E., 4,008,325.
Richards, John F.; and Tripp, Robert G., to Exxon Research and Engineering Company. Rotary filter wash distributor. 4,008,154, Cl. 210-217.000.
Richardson-Merrell Inc.: *See—*
Bambury, Ronald E.; Edwards, Michael L.; and Miller, Laird F., 4,008,221.
Sill, Arthur D.; and Sweet, Francis W., 4,008,240.
Richardson, Neil George, to Domtar Limited. Wood treatment with ammoniacal liquor and carbon dioxide. 4,008,342, Cl. 427-297.000.
Richco Plastic Company: *See—*
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Riddell, C. Randolph. Structural member and system. 4,007,574, Cl. 52-722.000.
Ridley, Richard D., to Occidental Petroleum Corporation. Oil collection and recovery system for in situ oil shale retort. 4,007,963, Cl. 299-2.000.
Rieu, Jean-Pierre: *See—*
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Riggin, Ojars; and Arnold, Charles B., to Sensors, Inc. Gas analyzing. 4,008,394, Cl. 250-345.000.
Rittenbach, Otto E., to United States of America, Army. Doppler radar for distinguishing between approaching and receding targets and having increased frequency response. 4,008,474, Cl. 343-7.700.
Ritter Engineering Company: *See—*
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Rittler, Hermann L.: *See—*
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Ritzert, Chalmer John: *See—*
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Caldwell, Edward N.; and Scott, Douglas R., 4,007,780.
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Robertson, Richard L. Solid fuel conversion furnace. 4,007,696, Cl. 110-31.000.
Robertsson, Hans R., to Saab-Scania Aktiebolag. System for transmitting position information. 4,007,991, Cl. 356-141.000.
Roden, Mack L. Hook assembly. 4,007,957, Cl. 294-82.00R.
Roever, Wilhelm: *See—*
Junghanss, Helmut; Roever, Wilhelm; Neuschutz, Dieter; and Scheffler, Ulrich, 4,008,076.
Roffe, Gerald Alton; and Trucco, Horacio Andres. Apparatus for the gas phase combustion of liquid fuels. 4,008,041, Cl. 431-247.000.
Rofidal, Serge, to Huiles Goudrons et Derives. Method of providing a surface dressing for a roadway. 4,007,995, Cl. 404-77.000.
Rogers, Russell L.: *See—*
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Rokugo Mfg. & Co., Ltd.: *See—*
Serizawa, Masakazu, 4,007,999.
Romero, Ervin Gordon, to Boeing Company, The. Aircraft automatic braking system. 4,007,970, Cl. 303-93.000.
Ronden, Clifford P.; and Rabel, Imre, to Grandview Industries, Limited. Apparatus for belling plastic pipe. 4,008,028, Cl. 425-145.000.
Rondo Building Services Pty. Limited: *See—*
Hunter, Richard Henry, 4,007,570.
Rood Tool Co.: *See—*
La Borde, Richard C., 4,008,380.
Roof, Lewis B.; and DeFord, Donald D., to Phillips Petroleum Company. Chromatographic analysis. 4,007,626, Cl. 73-23.100.
Roquemore, William D.: *See—*
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Rose, Manning I. Safety circuit and socket construction. 4,008,403, Cl. 307-113.000.
Rosen, George; Carlick, Daniel J.; and Reiter, Ralph H., to Sun Chemical Corporation. Photopolymerizable compounds and compositions comprising the product of the reaction of a monocarboxy-substituted benzophenone with a resin. 4,008,138, Cl. 204-159.140.
Rosendahl, Thomas E.: *See—*
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Roshon, George K.: *See—*
Christiansen, Paul; and Roshon, George K., 4,007,607.
Ross, Charles Warren, to Leeds & Northrup Company. Method and means for producing a control signal for process control including removable means for increasing gain as a time integral of error. 4,008,386, Cl. 235-150.100.
Rossi, Paul C.: *See—*
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Rossner, Heinrich-Otto; Radke, Dietrich; and Hartwig, Jurgen, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Method for melting sponge iron. 4,008,074, Cl. 75-43.000.
Roster, Theodore J.: *See—*
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Rowe, Edward A., Jr.; and Cawley, William H., to Diamond Shamrock Corporation. Methylene chloride phosphatizing. 4,008,101, Cl. 148-6.15R.

Rowley, James R.; and Sokol, Stephen R., to PPG Industries, Inc. Bottom edge support for an article shipping rack. 4,007,837, Cl. 206-448.000.

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Runge, Peter Klaus, to Bell Telephone Laboratories, Incorporated. Optical pulse transmission system. 4,008,390, Cl. 250-199.000.

Ruppert, Jurgen: *See*—
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Rust, Kurt; Schrott, Erwin; Strametz, Helmut; and Kablitz, Hans-Jurgen, to Hoechst Aktiengesellschaft. Process for the manufacture of a catalyst. 4,008,176, Cl. 252-429.00B.

Rust, Kurt; Schrott, Erwin; Strametz, Helmut; and Kablitz, Hans-Jurgen, to Hoechst Aktiengesellschaft. Process for the manufacture of a catalyst. 4,008,177, Cl. 252-429.00B.

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Rutz, Richard Frederick, to International Business Machines Corporation. AlN masking for selective etching of sapphire. 4,008,111, Cl. 156-656.000.

Rylewski, Eugeniusz M. Fluid rotative machine with variable displacement. 4,008,013, Cl. 418-16.000.

S.A.R.L. Salice France: *See*—
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Saab-Scania Aktiebolag: *See*—
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Sabacky, Milton J.: *See*—
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Saifi, Mansoor Ali; and Vahaviolos, Sotirios John, to Western Electric Company, Inc. Method and apparatus for evaluating welds using stress-wave emission techniques. 4,007,631, Cl. 73-71.400.

St. Regis Paper Company: *See*—
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Sakai, Kiyoharu: *See*—
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Sakamoto, Seiho: *See*—
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Sakauchi, Yoshiaki; Ushijima, Kazufumi; Suzuki, Hajime; and Wakamoto, Shigeru, to Sanyo Electric Co., Ltd. Automatic tuning apparatus. 4,008,437, Cl. 325-422.000.

Sakurada, Satoshi: *See*—
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Salemka, Robert M.: *See*—
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Salice, Luciano, to S.A.R.L. Salice France. Fixed hinge fitting. 4,007,514, Cl. 16-129.000.

Salzer, Erwin, to Chase-Shawmut Company, The. High-voltage fuse and process of manufacturing the same. 4,008,451, Cl. 337-161.000.

Samp, Ronald Lee, to Raymond Lee Organization, Inc., The, a part interest. Automobile engine tuning scope. 4,008,431, Cl. 324-16.00T.

San/Bar Corporation: *See*—
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Sandoz, Inc.: *See*—
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Sandoz Ltd.: *See*—
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Santora, Norman Julian: *See*—
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Saruwatari, Hidetoshi: *See*—
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Sarver, John Jeffery. Short ski. 4,007,946, Cl. 280-600.000.

Sasaki, Kazunori: *See*—
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Sasaoka, Nobuhiko, to Okamura Co., Ltd. Combination of block units. 4,007,555, Cl. 46-25.000.

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Sato, Koitsu: *See*—
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Sato, Shui: *See*—
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Satzinger, Gerhard; and Herrmann, Manfred, to Warner-Lambert Company. Process for the preparation of 4r-amino-1t-phenyl-1c-ethoxycarbonyl-cyclohexenes-(2). 4,008,233, Cl. 260-247.20B.

Sauer, Barry W., to Glasrock Products, Inc. Bone cap. 4,007,494, Cl. 3-1.900.

Sauer, Gerhard; Hauser, Helmut; Haffer, Gregor; Ruppert, Jurgen; Eder, Ulrich; and Wiechert, Rudolf, to Schering Aktiengesellschaft. Bicycloalkanes. 4,008,253, Cl. 260-340.700.

Sauer, Leo H., to Whirlpool Corporation. Clothes dryer with flexible drum. 4,007,546, Cl. 34-133.000.

Savage, David Samuel: *See*—
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Sawada, Hideo; and Kotani, Motoharu, to Daicel, Ltd. Method for preparing cellulose acetate fiber rods. 4,007,746, Cl. 131-267.000.

Sawada, Hideo: *See*—
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Sawada, Tohru: *See*—
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Sawaki, Mikio: *See*—
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Sawatari, Kenichi; Mukai, Toshihiko; Oda, Satoshi; Akashi, Hiroyuki; and Kohara, Masanori, to Yoshitomi Pharmaceutical Industries, Ltd. Certain salicylanilides. 4,008,274, Cl. 260-559.00S.

Sax, Alan M.: *See*—
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Sayigh, Adnan A. R.; Sun, Kwok K.; and Ulrich, Henri, to Upjohn Company, The. Process for isolating 4,4'-diaminodiphenylmethane. 4,008,275, Cl. 260-570.00D.

Scaggs, Anthony L., to Dow Chemical Company, The. Novel fire-retardant polymer. 4,008,186, Cl. 260-2.5FP.

Scaglia, Enzo, to M. Scaglia S.p.A. Yarn bobbin and method for manufacturing the same. 4,007,888, Cl. 242-118.600.

Schade, Otto Heinrich, Jr., to RCA Corporation. Current amplifier. 4,008,441, Cl. 330-35.000.

Schaefer, Joseph H., to Applied Power Inc. Engine diagnostic apparatus. 4,008,434, Cl. 324-16.00S.

Schaper, Helmut: *See*—
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Scharfen, Hans; and Steinberger, Josef, to Paul Forkardt Kommanditgesellschaft. Power operable jaw chuck. 4,007,943, Cl. 279-121.000.

Scheffler, Ulrich: *See*—
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Scheidl, Franz; and Nies, Herbert, to Hoechst Aktiengesellschaft. Stabilizer combination for halogen-containing polymers. 4,008,193, Cl. 260-23.0XA.

Scherbakov, Vsevolod Sergeevich; Gruzintsev, Igor Andreevich; and Zolotukhin, Viktor Mikhailovich. Piston compressor. 4,008,011, Cl. 417-446.000.

Schering Aktiengesellschaft: *See*—
Annen, Klaus; Hofmeister, Helmut; Laurent, Henry; Kieslich, Klaus; Wendt, Hans; and Mengel, Peter Klaus, 4,008,312.
Laurent, Henry; Wiechert, Rudolf; Mengel, Peter Klaus; and Kolb, Karl-Heinz, 4,008,313.
Sauer, Gerhard; Hauser, Helmut; Haffer, Gregor; Ruppert, Jurgen; Eder, Ulrich; and Wiechert, Rudolf, 4,008,253.

Scheurecker, Werner, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Strand guiding means to be used in a continuous casting plant. 4,007,822, Cl. 193-35.00R.

Schiffelbein, Richard A. Concrete delivery apparatus. 4,007,821, Cl. 193-4.000.

Schiffman, Stanley P.: *See*—
Harris, Steven K.; and Schiffman, Stanley P., 4,007,956.

Schippers, Heinz; and Lenk, Erich, to Barmag Barmer Maschinenfabrik Aktiengesellschaft. Winding apparatus. 4,007,884, Cl. 242-41.000.

Schlinger, Warren G., to Texaco Inc. Secondary recovery of oil by steam stimulation plus the production of electrical energy and mechanical power. 4,007,786, Cl. 166-266.000.

Schmidt, Peter Jurgen: *See*—
Neidhard, Horst; Linder, Ernst; Wahl, Josef; Schmidt, Peter Jurgen; and Schoeck, Peter A., 4,007,589.

Schneider, Abraham: *See*—
Moore, Robert E.; and Schneider, Abraham, 4,008,251.

Schneider, William P., to Upjohn Company, The. Racemic fluoro-substituted PGF_2 analogs. 4,008,263, Cl. 260-468.00D.

Schnell, William J.: *See*—
Miller, Jimmy L.; and Schnell, William J., 4,008,157.

Schoeck, Peter A.: *See*—
Neidhard, Horst; Linder, Ernst; Wahl, Josef; Schmidt, Peter Jurgen; and Schoeck, Peter A., 4,007,589.

Scholtus, Christiaan Gustaaf Adolf: *See*—
Piepers, Gijsbrecht Gerhardus; and Scholtus, Christiaan Gustaaf Adolf, 4,007,899.

Schott, Lawrence A.: *See*—
Schott, Roger A.; and Schott, Lawrence A., 4,007,614.

Schott, Roger A.; and Schott, Lawrence A. Lock for vehicles. 4,007,614, Cl. 70-234.000.

Schramm, Benjamin B.; and Paul, Alan M. Transducer signal conditioning circuit. 4,008,398, Cl. 250-372.000.

Schreiber, Peter J., to N.A.D., Inc. Fluidic controlled ventilator. 4,007,736, Cl. 128-145.800.

Schriber, Gene Arnold: *See*—
Nash, Harold Garth; Schriber, Gene Arnold; and Linford, John Robert, 4,008,373.

Schroeder, Manfred Robert, to Bell Telephone Laboratories, Incorpo-

rated. Processing of two noise contaminated, substantially identical signals to improve signal-to-noise ratio. 4,008,439, Cl. 328-163.000.

Schrott, Erwin: *See—*
Rust, Kurt; Schrott, Erwin; Strametz, Helmut; and Kablitz, Hans-Jurgen, 4,008,176.
Rust, Kurt; Schrott, Erwin; Strametz, Helmut; and Kablitz, Hans-Jurgen, 4,008,177.

Schuetz, James W.; and Martin, William A., to Aetna-Standard Engineering Company. Flying cutter with continuous work piece support. 4,007,655, Cl. 83-155.000.

Schutz, Karl-Heinz; and Peter, Heinz, to SKF Industrial Trading and Development Company, B.V. Articulated bearing. 4,007,975, Cl. 308-238.000.

Schwartz, Edward J. Pipe coupler. 4,007,993, Cl. 403-3.000.

Schwelmer Eisenwerk Muller & Co. GmbH: *See—*
Fedrigo, Renzo; Borrini, Bartolomeo; Garattini, Vittorio; and Pino, Giovanni, 4,008,021.

SCM Corporation: *See—*
Weinberger, Ernest F., 4,007,644.

Scoggin, Baxter I., Jr.; Vaughan, Woodrow E.; Reed, Gerald D.; Cartner, Don W.; Hill, David E.; and Briar, Jack E., to Modern Plastic Sales. Brush head. 4,007,510, Cl. 15-176.000.

Scott, Douglas J. Device for increasing the torque applied to a hand tool. 4,007,651, Cl. 81-180.00R.

Scott, Douglas R.: *See—*
Caldwell, Edward N.; and Scott, Douglas R., 4,007,780.

Scott, William A., to Walbro Corporation. Governor for two-cycle engines. 4,007,717, Cl. 123-103.00R.

Scottish Agricultural Industries Limited: *See—*
Davidson, Eric, 4,008,314.

Sebel, Hans-Georg, to Henkel & Cie G.m.b.H. Adhesives based upon polyvinyl alcohol and starch. 4,008,116, Cl. 156-328.000.

Seddon, Peter: *See—*
Bromfield, Ian Derek; and Seddon, Peter, 4,007,988.

Segars, Ronald A., to United States of America, Army. Apparatus for determining the textural qualities of food. 4,007,632, Cl. 73-78.000.

Seikagaku Kogyo Co., Ltd.: *See—*
Fujita, Yoshimasa; Matsumoto, Akiyoshi; Ishikawa, Hachiro; Hishida, Tadashi; Kato, Hideo; and Takamisawa, Hiroshi, 4,008,124.

Seiler, Hans: *See—*
Keusch, Andreas, 4,007,521.

Seipel, Thomas E., to Oscar Mayer & Co. Inc. Article display rack. 4,007,841, Cl. 211-59.100.

Sellers, John; Griffiths, Mary; and Dyer, Thomas Harry, to Thomas French & Sons Limited. Narrow fabrics. 4,007,763, Cl. 139-116.000.

Sellstedt, John H., to American Home Products Corporation. Intermediates for preparing semi-synthetic cephalosporins and processes relating thereto. 4,008,226, Cl. 260-243.00C.

Semperit Aktiengesellschaft: *See—*
Gluck, Maternus; Kriegner, Walter; and Eder, Bernhard, 4,007,556.

Sensors, Inc.: *See—*
Risgin, Ojars; and Arnold, Charles B., 4,008,394.

Serizawa, Masakazu, to Rokugo Mfg. & Co., Ltd. Fan rotor for cross-flow fan. 4,007,999, Cl. 416-178.000.

Serris, Robert E.: *See—*
Zar, Jacob L.; and Serris, Robert E., 4,008,444.

Shacklett, Robert L.: *See—*
Nance, W. Franklin; and Shacklett, Robert L., 4,008,378.

Sharp Kabushiki Kaisha: *See—*
Takano, Rikuo; and Sumitomo, Yuji, 4,007,684.
Ueno, Atsushi; Sakai, Kiyoharu; and Fujimoto, Showhey, 4,008,372.

Shatterproof Glass Corporation: *See—*
Krebs, Jacob, 4,007,727.

Shaver, J. Lyle, to Allis-Chalmers Corporation. Grain accelerator precleaner. 4,007,744, Cl. 130-27.00Q.

Shaw, Edwin L., to Abex Corporation. Control system for variable displacement pumps. 4,008,004, Cl. 417-216.000.

Shay, Joseph John, to Summit Packaging Systems, Inc. Squeeze-bottle-type powder dispenser. 4,007,858, Cl. 222-193.000.

Shea, John J.; and Phillips, Harry. High speed bone drill. 4,007,528, Cl. 32-26.000.

Sheets, Ronald E., to Tamarack Scientific Co. Inc. Vacuum contact printing system and process for electronic circuit photomask replication. 4,007,987, Cl. 355-91.000.

Shekleton, Jack R.: *See—*
Compton, William A.; Duffy, Thomas E.; LeCren, Richard T.; and Shekleton, Jack R., 4,008,039.

Shell Oil Company: *See—*
Knapp, Randolph H., 4,008,096.
Verbrugge, Pieter A.; and Uurbanus, Elisabeth W., 4,008,287.

Sheppard, Chester Stephen: *See—*
MacLeay, Ronald Edward; and Sheppard, Chester Stephen, 4,008,273.

Sherer, C. Richard; and Webber, Jack, to DND Corporation. Apparatus for treating a cylindrical object. 4,007,705, Cl. 118-7.000.

Shibata, Masaru: *See—*
Inoue, Mayumi; Shibata, Masaru; Takahashi, Kenzo; and Nakatani, Sadao, 4,008,351.

Shillinger, George L., Jr., to United States of America, National Aeronautics and Space Administration. Spring operated accelerator and constant force spring mechanism therefor. 4,007,623, Cl. 73-12.000.

Shimago, Kozo: *See—*
Tobiki, Hisao; Yamada, Hirotada; Nakatsuka, Iwao; Shimago, Kozo; Okano, Shigeru; Nakagome, Takenari; Komatsu, Toshiaki; Izawa, Akio; Noguchi, Hiroshi; and Eda, Yasuko, 4,008,220.

Shimoguchi, Kozo: *See—*
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Shinagawa, Susumu: *See—*
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Shindo, Shuichi: *See—*
Aono, Masazumi; Shindo, Shuichi; and Miyazako, Takushi, 4,008,087.

Shinkawa, Keiro; Sodeyama, Chiuichi; and Shoyama, Hirozi, to Hitachi, Ltd. Rat-race mixer circuit. 4,008,438, Cl. 325-446.000.

Shinomiya, Tsutomu; and Itoh, Sanji, to Kabushiki Kaisha Tomoku. Continuously variable cutting apparatus for elongated sheet members. 4,007,652, Cl. 83-106.000.

Shintani, Tsuneo, to Kurosaki Refractories Co., Ltd. Compositions for plugs of refractory material. 4,008,194, Cl. 260-28.00R.

Shipes, Kelly V., to Hudson Products Corporation. Axial flow fan assembly. 4,008,007, Cl. 417-363.000.

Shokite, Richard J., to Warnaco, Inc. Molding apparatus. 4,008,029, Cl. 425-157.000.

Shoup, Jerry F.: *See—*
Gelfand, Peter C.; Carpenter, Richard A.; and Shoup, Jerry F., 4,008,057.

Shoyama, Hirozi: *See—*
Shinkawa, Keiro; Sodeyama, Chiuichi; and Shoyama, Hirozi, 4,008,438.

Shulke, David D.: *See—*
Peifer, Gary S.; and Shulke, David D., 4,007,958.

Shuttle, Anthony J., Jr. Method of recovering useful minerals from subterranean deposits thereof. 4,007,965, Cl. 299-11.000.

Siber, Erwin-Walter C. Spinning top bowling game. 4,007,935, Cl. 273-108.000.

Siegl, Herbert: *See—*
Kunstle, Gerhard; and Siegl, Herbert, 4,008,260.

Siegle, Peter; Kuhle, Engelbert; Hammann, Ingeborg; Behrenz, Wolfgang; and Homeyer, Bernhard, to Bayer Aktiengesellschaft. N-methyl-N-(3-trifluoromethylphenylsulfenyl)-carbonyloxime-carbamates. 4,008,328, Cl. 424-298.000.

Siegrist, Adolf Emil; and Coviello, Vincenzo, to Ciba-Geigy Corporation. Process for the manufacture of cyano-substituted stilbene compounds. 4,008,224, Cl. 260-240.0CA.

Siemens Aktiengesellschaft: *See—*
Doring, Christfried; Thomas, Johann; Volcker, Manfred; Sparwald, Volker; and Habersack, Walter, 4,008,142.
Fleer, Ernst Otto, 4,007,529.
Friebel, Eberhard, 4,007,635.
Geyer, Gerhard, 4,008,366.
Kraus, Hubert, 4,007,520.
Muller, Alfred; and Fink, Arno, 4,008,102.
Navratil, Franz, 4,008,420.
Raven, Manfred V., 4,008,461.
Sunderhauf, Heinz, 4,008,367.
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Signorini, Ernesto: *See—*
Gozzo, Franco; Masoero, Marcella; Signorini, Ernesto; and Fabbrini, Riccardo, 4,008,071.

Sill, Arthur D.; and Sweet, Francis W., to Richardson-Merrell Inc. Xanthene and thioxanthene derivatives. 4,008,240, Cl. 260-293.580.

Silverbush, Herbert M.; and Jensen, Philip B., to Rau Fastener, a division of U.S. Industries, Inc. Method of registering logo carrying fastener prior to emplacement on garment. 4,007,537, Cl. 29-432.100.

Simms, Larry L. Icebox conversion unit. 4,007,600, Cl. 62-3.000.

Simon, Alan J.: *See—*
O'Keeffe, Terrence W.; and Simon, Alan J., 4,008,402.

Simons, Jacques: *See—*
Mauvernay, Roland-Yves; Busch, Norbert; Moleyre, Jacques; Simons, Jacques; and Monteil, Andre, 4,008,329.

Simpson Manufacturing Co., Inc.: *See—*
Gilb, Tyrell T., 4,007,573.

Singh, Baldev: *See—*
Lesher, George Y.; and Singh, Baldev, 4,008,235.

Singh, Satinder: *See—*
Anderson, Joseph; Lagasse, Joseph Louis; Singh, Satinder; and Milalauskas, Victor, 4,008,447.

Sioux Steam Cleaner Corporation: *See—*
Finger, John F.; and Pochop, Merle E., 4,007,712.

Sjogren, Bjorn Christer: *See—*
Gustavsson, John Kenneth Crister; and Sjogren, Bjorn Christer, 4,007,678.

Skauli, Oyvind, to Norsk Hydro A.S. Method of pan granulation. 4,008,064, Cl. 71-28.000.

SKF Industrial Trading and Development Company, B.V.: *See—*
Huber, Wolfgang, 4,007,974.
Schutz, Karl-Heinz; and Peter, Heinz, 4,007,975.

Skil Corporation: *See—*
Gawron, Alex F.; and Dillon, William E., 4,007,795.

Slater Electric Inc.: *See—*
Gernhardt, Paul D., 4,007,852.

Slemp, Wayne S., to United States of America, National Aeronautics

and Space Administration. Particulate and solar radiation stable coating for spacecraft. 4,008,348, Cl. 428-35.000.
Slobodkin, Leonid Vladimirovich: *See—*
Frolov, Jury Fedorovich; Naryshkin, Jury Anatolievich; Cherednichenko, Vladimir Semenovich; Piljukov, Jury Fedorovich; Orlov, Gennady Ivanovich; Mikulinsky, Aron Semenovich; Suturin, Serafim Nikolaevich; Slobodkin, Leonid Vladimirovich; and Dashkov, Konstantin Stepanovich, 4,008,364.
Smagghe, Paul V.; and Villier, Raymond B., to Masoneilan International, Inc. Process and device for attenuating noise caused by a valve during the expansion of a fluid. 4,007,908, Cl. 251-127.000.
Smani, Smael Mohammed, to Office Cherifien des Phosphates. Process for enrichment, by flotation, of phosphate ores with gangues containing carbonates. 4,008,151, Cl. 209-9.000.
Smith, Donald F.: *See—*
Albano, John V.; and Smith, Donald F., 4,007,670.
Smith, Donald Leslie; and Noble, Donald William, to Canada, Her Majesty The Queen in right of, as represented by the Minister of National Defense. Rocket retention and ignition assembly. 4,007,660, Cl. 89-1.807.
Smith, Howell K., II: *See—*
Crawford, George H.; and Smith, Howell K., II, 4,008,350.
Smith International, Inc.: *See—*
Dixon, Robert L.; and Allison, Robert E., 4,007,799.
Smith, Valor Clark, to CHU Associates, Inc. Dual-frequency circularly polarized spiral antenna for satellite navigation. 4,008,479, Cl. 343-895.000.
Smith, William V. Device for indicating angular position and depth of a towed vehicle. 4,008,466, Cl. 340-282.000.
Smithfield Fibers, Inc.: *See—*
Blezard, Robert C., 4,007,611.
Snam Progetti S.p.A.: *See—*
Re, Luciano; and Zappelli, Piergiorgio, 4,008,363.
Snyder, Donald L.: *See—*
Brunnett, Carl J.; Cox, Jerome R., Jr.; Snyder, Donald L.; and Mattson, Rodney A., 4,008,400.
Snyder, William Joseph, to Zapata Industries, Inc. Anti-missiling bottle structure. 4,007,848, Cl. 215-31.000.
Soble, Bernard D. Foundation for modular buildings. 4,007,568, Cl. 52-294.000.
Sobolev, Igor; and Panusch, Erwin, to Kaiser Aluminum & Chemical Corporation. Synergistic flame-retarding compositions for cellulosic boards. 4,008,214, Cl. 260-17.300.
Societe Anonyme dite: Automobiles Peugeot: *See—*
de Rosa, Daniel, 4,007,802.
Nartowski, Andre, 4,008,297.
Societe Anonyme dite: Centre Europen de Recherches Mauvernay (C.E.R.M.): *See—*
Mauvernay, Roland-Yves; Busch, Norbert; Moleyre, Jacques; Simons, Jacques; and Monteil, Andre, 4,008,329.
Societe Anonyme dite: L'Oreal: *See—*
Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, 4,007,747.
Kalopissis, Gregoire; Gascon, Jean; Bugaut, Andree; Gallien, Jacqueline; and Gaston-Breton, Hubert, 4,008,272.
Societe C.M.V.: *See—*
Guillard, Dzidris, 4,007,559.
Sodekoda, Kinzo; and Taguchi, Norikazu, to Tanaka Instrument Co., Ltd. Fractional horsepower brushless direct current motor. 4,008,422, Cl. 318-138.000.
Soderberg, Gosta. Method of using a sealing strip to mount a glass panel in a sheet metal body. 4,007,536, Cl. 29-421.00R.
Sodeyama, Chiuichi: *See—*
Shinkawa, Keiro; Sodeyama, Chiuichi; and Shoyama, Hirozi, 4,008,438.
Soiron, Charles: *See—*
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Sokol, Stephen R.: *See—*
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Solartron Electronic Group Limited, The: *See—*
Stansfeld, James Woolryche, 4,007,627.
Solis, Cruz Luevano. Vehicle wheel accessory mounting fixture and removable accessories therefor. 4,007,968, Cl. 301-38.00R.
Somerville, Dean S.: *See—*
Brandt, Paul W.; and Somerville, Dean S., 4,007,535.
Sommer, Richard; and Wolfrum, Gerhard, to Bayer Aktiengesellschaft. Benzenesulphonylbenzenesulphonamideazophenyl-or-naphthylazolhydroxyloweralkoxyphenyl dyestuffs. 4,008,216, Cl. 260-186.000.
Sorensen, Norman E.; and Latham, Eldon A., to United States of America, National Aeronautics and Space Administration. Jet engine air intake system. 4,007,891, Cl. 244-53.00B.
Soukup, Robert J.: *See—*
Kung, Jo-Fen T.; Clinton, William P.; and Soukup, Robert J., 4,008,340.
Southwire Company: *See—*
Chia, Enrique C., 4,007,923.
Loest, Kent W.; and Ewing, Vernon R., 4,008,307.
Spain, Harold T. String mounting and adjustment for steel guitars. 4,007,658, Cl. 84-312.000.
Sparwald, Volker: *See—*
Doring, Christfried; Thomas, Johann; Volcker, Manfred; Sparwald, Volker; and Habersack, Walter, 4,008,142.
Specker, Manfred: *See—*
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Sperry Rand Corporation: *See—*
Niemiec, Albin J.; and Pettibone, Raymond B., 4,008,002.
Zoya, Walter J., 4,007,592.
Spevack, Jerome S., to Deuterium Corporation. Dual temperature exchange apparatus. 4,008,046, Cl. 23-270.50W.
Spitzer, Wayne A., to Eli Lilly and Company. Halo substituted β-lactam antibiotics. 4,008,229, Cl. 260-243.00C.
Spurlin, William V.; and Carroll, Patrick J., to FMC Corporation. Vibratory parts feeder driven by rotating eccentric weights. 4,007,825, Cl. 198-770.000.
Staal, Gerardus B.: *See—*
Henrick, Clive A.; and Staal, Gerardus B., 4,008,258.
Staats, Henry N., to General Binding Corporation. Method of manufacturing a book binding element. 4,008,305, Cl. 264-336.000.
Staebler, Paul J., to Caterpillar Tractor Co. Piston seals for rotary mechanisms. 4,008,014, Cl. 418-51.000.
Stahl, Edward L., to Pinckney Molded Plastics, Inc. Three-level full slide-on container. 4,007,839, Cl. 206-503.000.
Stainless Equipment Company: *See—*
Molitor, Victor D., 4,007,566.
Stancati, Nicholas F., to ACTA Limited. Seal for duct terminator. 4,007,941, Cl. 277-178.000.
Standard Brands Incorporated: *See—*
Akerman, Emanuel; and Pomper, Seymour, 4,008,335.
Standard Oil Company (Indiana): *See—*
Chipman, Gary R.; and Bockrath, Ronald E., 4,008,206.
Puskas, Imre; and Cengel, John A., 4,008,168.
Stanford, James R.: *See—*
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Stange, Klaus K., to Xerox Corporation. Method and apparatus for ultrasonically cleaning a photoconductive surface. 4,007,982, Cl. 355-15.000.
Stanley Works, The: *See—*
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Stansfeld, James Woolryche, to Solartron Electronic Group Limited, The. Density transducers. 4,007,627, Cl. 73-32.00A.
Stauffer Chemical Company: *See—*
Mihailovski, Alexander; and Baker, Don R., 4,008,318.
Stauffer, Robert J.: *See—*
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Ste Legris France S.A.: *See—*
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Stearley, John W., to Robertshaw Controls Company. Shielded control device therefor. 4,008,419, Cl. 361-334.000.
Steele, Bobby C.; Barr, Douglas R.; Hunt, Charles T.; and Ayres, James L., to Gold Kist Inc. Solvent extraction of oil from oil seeds. 4,008,210, Cl. 260-123.500.
Stehle, Axel: *See—*
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Steinberger, Josef: *See—*
Scharfen, Hans; and Steinberger, Josef, 4,007,943.
Stencel, Edgar L., to VSI Corporation. Fastener insert with improved anti-rotation and pull-out characteristics. 4,007,659, Cl. 85-70.000.
Stepe, Visvaldis A., to Caterpillar Tractor Co. Replaceable corner tooth assembly. 4,007,550, Cl. 37-141.00T.
Stephens-Adamson, Inc.: *See—*
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Stephens, John A.: *See—*
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Stephenson, Robert Larry; Loomba, Yogendra Singh; and Fox, William Robert, to Allied Chemical Corporation. Release for safety belt tension-relieving apparatus. 4,007,948, Cl. 280-744.000.
Sterling Drug Inc.: *See—*
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Carabateas, Philip M.; and Williams, Gordon L., 4,008,239.
Lesher, George Y.; and Singh, Baldev, 4,008,235.
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Stevenson, James S. Spray equipment and method. 4,007,876, Cl. 239-10.000.
Stiot, Jean-Pierre Henri: *See—*
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Stirland, Harry. Transmission assembly. 4,007,649, Cl. 74-803.000.
Stolkin, Walter J.; and Sax, Alan M., to Stolmar Corporation. Corrugated carton constructions. 4,007,869, Cl. 229-41.00B.
Stolmar Corporation: *See—*
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Stolz, Albert; and Stehle, Axel, to Daimler-Benz Aktiengesellschaft. Installation for venting the interior space of a motor vehicle. 4,007,875, Cl. 237-12.30A.
Storm, Elwood H.: *See—*
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Strametz, Helmut: *See—*
Rust, Kurt; Schrott, Erwin; Strametz, Helmut; and Kablitz, Hans-Jurgen, 4,008,176.
Rust, Kurt; Schrott, Erwin; Strametz, Helmut; and Kablitz, Hans-Jurgen, 4,008,177.
Strandell, Per-Olof: *See—*
Falk, Curt Gunnar; Strandell, Per-Olof; Albrecht, Per Erik; and Wallner, Goran Anders, 4,007,617.
Strandine, Eldon J.; and Koonz, Carl H., to Swift and Company Limited. Method for injecting a liquid additive into poultry flesh without penetrating the skin. 4,008,338, Cl. 426-281.000.
Straus, Albert E. Clamp for tennis racquet. 4,007,930, Cl. 273-74.000.
Striegler, John Howard; and Howell, Eddie Paul, to Atlantic Richfield Company. Recovery of bitumen from tar sands. 4,007,788, Cl. 166-272.000.

Strobel, Manfred, to Carl Still, Firma. Intermediate head for coke oven batteries. 4,008,129, Cl. 202-268.000.

Stubbs, John K.: *See—*
Acheson, Richard M.; Stubbs, John K.; Baxter, Charles A. R.; and Kuhla, Donald E., 4,008,245.

Stubbs, William K.: *See—*
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Sturkey, William Cleere: *See—*
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Suciu, Maria: *See—*
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Suda, Masashi: *See—*
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Sugihara, Kunihiko: *See—*
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Sugihara, Toshiyuki: *See—*
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Sugisaki, Takao; Ochiai, Tatsushiro; Nishikawa, Kyoichi; and Higurashi, Minoru, to TDK Electronics Company, Limited. Apparatus for detecting an external magnetic field. 4,008,432, Cl. 324-43.00R.

Sugiura, Akio; Okamoto, Atutoshi; Nogami, Takahiro; and Ohta, Jun, to Nippondenso Co., Ltd.; and Toyota Jidosha Kogyo Kabushiki Kaisha. Anti-skid control system for vehicles. 4,007,971, Cl. 303-109.000.

Suitto, John D., Jr.: *See—*
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Sullivan, Patrick Bernard; and Mitchell, Glenn Franklin, to Union Carbide Corporation. Separation of cobalt from nickel thiocyanates with isophorone. 4,008,308, Cl. 423-139.000.

Sumitomo Bakelite Company, Limited: *See—*
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Sun Oil Company, (Sun Research and Development Co.): *See—*
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Sun, Tsu Hung; and Basiulis, Algerd, to Hughes Aircraft Company. Switchable heat pipe assembly. 4,007,777, Cl. 165-32.000.

Sundberg, Erik G.; and Westberg, Erik, to Aktiebolaget Tudor. Sheath for tubular storage battery electrodes and method for their production. 4,008,100, Cl. 29-623.400.

Sunderhauf, Heinz, to Siemens Aktiengesellschaft. Power cable with plastic insulation and an outer conducting layer. 4,008,367, Cl. 174-107.000.

Surgical Design Corporation.: *See—*
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Sutton, John R. Jacking mechanism. 4,007,914, Cl. 254-108.000.

Suturin, Serafim Nikolaevich: *See—*
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Svedia Dental-Industri AB: *See—*
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Swaniger, James R., to Pitney-Bowes, Inc. Tape guide for postage meter printing machine. 4,007,681, Cl. 101-288.000.

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Swiss Aluminium Ltd.: *See—*
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Systems Research Laboratories, Inc.: *See—*
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Szabo, Francis S., to Addressograph Multigraph Corporation. Photocomposition escapement drive system. 4,008,480, Cl. 354-5.000.

Szczepanski, Jerzy W.; and Wilczynski, Wieslaw, to Politechnika Warszawska. Arrangement for registering and reading of message units in telephone exchanges. 4,008,377, Cl. 179-7.00R.

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Tabor, Alga M. Aircraft flight method and apparatus for boosting an aircraft to a very high altitude and thereafter boosting the aircraft to a high rate of forward speed. 4,007,892, Cl. 244-62.000.

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Taiyo Package Co. Ltd.: *See—*
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Tanaka, Junzo; Takami, Tsuyoshi; and Kai, Toshio, to Matsushita Electric Industrial Co., Ltd. Microwave oven door assembly. 4,008,383, Cl. 219-10.55D.

Tanaka, Keisuke: *See—*
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Tanaka, Toshio: *See—*
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Tax, Hans. Artificial island and method of assembling the same. 4,007,598, Cl. 61-90.000.

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Theurer, Donald L.; and Dormans, Paul M., to Magnavox Company, The. Telephone interfaced subscription cable television system especially useful in hotels and motels. 4,008,369, Cl. 358-84.000.
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Thomas, Richard Dean. Microcide. 4,008,332, Cl. 424-334.000.
Thompson, Arthur D.; and Kaibara, Imao, to Emco Ltd. Bathtub stopper. 4,007,500, Cl. 4-295.000.
Thompson, Dean O.: *See—*
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Thorsen, Gunnar. Extraction and separation of metals from solids using liquid cation exchangers. 4,008,134, Cl. 204-108.000.
Tibbs, Edward A. Utensil retaining means. 4,007,527, Cl. 30-327.000.
Tiefenbrun, Ivor S. Loudspeaker systems. 4,008,374, Cl. 179-1.00E.
Tiepel, Erich W.; Lee, Pang K.; Kitzes, Arnold S.; and Grover, Donald L., to Westinghouse Electric Corporation. Volume reduction of spent radioactive ion exchange resin. 4,008,171, Cl. 252-301.10W.
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Toko Yakuhin Kogyo Kabushiki Kaisha: *See—*
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Toray Industries, Inc.: *See—*
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Townsend, John Melvin; and Valentine, Donald Herman, Jr., to Hoffmann-La Roche Inc. Preparation of triaryl phosphines. 4,008,282, Cl. 260-606.50P.
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Tucker, Harold A., to B. F. Goodrich Company, The. Ethylenically unsaturated blocked aromatic diisocyanates. 4,008,247, Cl. 260-308.00B.
Turley, Richard J., to Olin Corporation. Polyurethane foams having reduced flammability. 4,008,187, Cl. 260-2.5AJ.
Turner, James Keith; Sturkey, William Cleere; and Aurich, Christoph W., to Gaston County Dyeing Machine Company. Heat treatment of textile fabric prior to wet processing. 4,007,517, Cl. 26-18.500.
Tyree, Gerald W., to Lockheed Aircraft Corporation. Method for fabricating a cavity rivet assembly. 4,007,540, Cl. 29-509.000.
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control apparatus for an engine exhaust gas purification system. 4,007,756, Cl. 137-115.000.
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National Aeronautics and Space Administration; administrator; with respect to an invention of:
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Brugger, Robert M.; Miller, Lowell G.; and Young, Robert C., 4,008,411.
Yuda, Sumio; Sawada, Tohru; and Moriya, Kohji, to Warabi Special Steel Co., Ltd. Magnetic materials. 4,008,105, Cl. 148-101.000.
Yuito, Isamu; Sato, Kikuji; and Hirano, Mikio, to Hitachi, Ltd. Thin-film field-emission electron source and a method for manufacturing the same. 4,008,412, Cl. 313-309.000.

Yuugen Kaisha Matsushima Seisakusho: *See*—
Matsushima, Ryuzo, 4,007,768.
Zabransky, Robert F.; and Anderson, Robert F., to Universal Oil Products Company. Simulated moving bed alkylation process. 4,008,291, Cl. 260-683.430.
Zahring, Gerhard: *See*—
Gradl, Ottmar; Loebel, Wolf; Rossmann, Axel; Zech, Herbert; and Zahring, Gerhard, 4,008,000.
Zaloga, Peter P. Register with air-driven oscillating louvers. 4,007,673, Cl. 98-40.00V.
Zapata Industries, Inc.: *See*—
Snyder, William Joseph, 4,007,848.
Walker, Rocco David, 4,007,851.
Zappelli, Piergiorgio: *See*—
Re, Luciano; and Zappelli, Piergiorgio, 4,008,363.
Zar, Jacob L.; and Serris, Robert E., to Avco Everett Research Laboratory, Inc. Feedback control of a laser output. 4,008,444, Cl. 331-94.50S.
Zdrodowski, Joseph John, to Hoffmann-La Roche Inc. Fluorometer flow cell. 4,008,397, Cl. 250-373.000.
Zech, Herbert: *See*—
Gradl, Ottmar; Loebel, Wolf; Rossmann, Axel; Zech, Herbert; and Zahring, Gerhard, 4,008,000.
Zeffer, Peter P.: *See*—
Brandon, Ross H.; and Zeffer, Peter P., 4,007,533.
Zeichner, Erwin: *See*—
Dietzel, Walter; Matusch, Siegfried; Schaper, Helmut; and Zeichner, Erwin, 4,008,098.
Zenitz, Bernard L., to Sterling Drug Inc. Phenyl-lower-alkylamines. 4,008,276, Cl. 260-570.50P.
Zernig, Ernst. Single-pivot hinge. 4,007,513, Cl. 16-128.00R.
Zin, Gary K.: *See*—
Korostoff, Edward; and Zin, Gary K., 4,008,035.
Zingg, Warren M., to Dow Chemical Company, The. Apparatus for mixing dry particles with a liquid. 4,007,921, Cl. 259-151.000.
Zoecon Corporation: *See*—
Henrick, Clive A.; and Staal, Gerardus B., 4,008,258.
Zollinger, Howard A.: *See*—
Lubbers, LeRoy; Stubbs, William K.; and Zollinger, Howard A., 4,007,843.
Zolotukhin, Viktor Mikhailovich: *See*—
Scherbakov, Vsevolod Sergeevich; Gruzintsev, Igor Andreevich; and Zolotukhin, Viktor Mikhailovich, 4,008,011.
Zorini, Luigi Omodeo, to Comez, S.p.A. Twisted beard needle. 4,007,609, Cl. 66-116.000.
Zoya, Walter J., to Sperry Rand Corporation. Power transmission. 4,007,592, Cl. 60-391.000.

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 48,560	4,002,772	Mar. 30, 1976	Jan. 11, 1977
B 54,859	4,000,101	Feb. 17, 1976	Dec. 28, 1976
B 59,512	3,999,216	Mar. 16, 1976	Dec. 21, 1976
B 71,613	4,008,393	Mar. 16, 1976	Feb. 15, 1977
B 73,017	4,001,879	Mar. 9, 1976	Jan. 4, 1977
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976
B 97,259	3,999,614	Mar. 9, 1976	Dec. 28, 1976
B 105,006	4,007,074	Mar. 23, 1976	Feb. 8, 1977
B 111,130	4,001,380	Mar. 16, 1976	Jan. 4, 1977
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976
B 167,470	4,001,101	Mar. 2, 1976	Jan. 4, 1977
B 181,208	4,001,391	Mar. 9, 1976	Jan. 4, 1977
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976
B 214,925	3,997,648	Mar. 9, 1976	Dec. 14, 1976
B 223,678	3,989,159	Mar. 9, 1976	Nov. 2, 1976
B 231,416	4,000,054	Mar. 30, 1976	Dec. 28, 1976
B 236,342	4,001,182	Feb. 10, 1976	Jan. 4, 1977
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976
B 257,143	4,000,111	Mar. 16, 1976	Dec. 28, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976
B 270,351	3,997,893	Mar. 30, 1976	Dec. 14, 1976
B 271,743	4,001,195	Mar. 16, 1976	Jan. 4, 1977
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976
B 279,415	4,000,697	Mar. 16, 1976	Jan. 4, 1977
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976
B 283,941	3,995,313	Feb. 3, 1976	Nov. 30, 1976
B 288,757	4,001,072	Mar. 30, 1976	Jan. 4, 1977
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976
B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976
B 313,280	4,003,591	Apr. 6, 1976	Jan. 18, 1977
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976
B 328,116	4,000,774	Mar. 9, 1976	Jan. 4, 1977
B 330,719	4,001,121	Mar. 16, 1976	Jan. 4, 1977
B 330,736	3,996,299	Feb. 3, 1976	Dec. 7, 1976
B 332,442	4,001,231	Mar. 30, 1976	Jan. 4, 1977
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976
B 333,247	4,001,201	Mar. 16, 1976	Jan. 4, 1977
B 333,838	4,006,263	Mar. 23, 1976	Feb. 1, 1977
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976
B 337,823	4,002,746	Mar. 23, 1976	Jan. 11, 1977
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976
B 339,446	4,001,067	Feb. 24, 1976	Jan. 4, 1977
B 340,170	4,000,444	Mar. 30, 1976	Dec. 28, 1976
B 347,661	3,999,218	Mar. 16, 1976	Dec. 21, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976
B 351,455	4,001,309	Feb. 24, 1976	Jan. 4, 1977
B 354,959	3,995,996	Feb. 17, 1976	Dec. 7, 1976
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976
B 357,526	4,001,319	Mar. 23, 1976	Jan. 4, 1977
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976
B 363,565	4,004,821	Mar. 30, 1976	Jan. 25, 1977
B 364,797	3,996,131	Feb. 17, 1976	Dec. 7, 1976
B 367,305	3,998,640	Mar. 2, 1976	Dec. 21, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976
B 371,095	4,005,074	Mar. 23, 1976	Jan. 25, 1977
B 371,912	3,995,738	Mar. 2, 1976	Dec. 7, 1976
B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976
B 372,232	4,000,967	Mar. 16, 1976	Jan. 4, 1977
B 372,722	3,998,925	Mar. 9, 1976	Dec. 21, 1976
B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976
B 374,553	4,008,394	Mar. 30, 1976	Feb. 15, 1977
B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976
B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
B 378,760	4,001,477	Mar. 9, 1976	Jan. 4, 1977
B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976
B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976
B 381,985	3,990,775	Feb. 3, 1976	Nov. 9, 1976
B 383,697	4,008,211	Feb. 17, 1976	Feb. 15, 1977
B 384,225	3,998,523	Mar. 16, 1976	Dec. 21, 1976
B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 385,024	3,994,911	Feb. 10, 1976	Nov. 30, 1976
B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 387,337	D 243,157	Mar. 16, 1976	Jan. 25, 1977
B 389,155	4,000,970	Mar. 30, 1976	Jan. 4, 1977
B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 390,979	4,003,850	Mar. 23, 1976	Jan. 18, 1977
B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 391,844	3,999,165	Mar. 16, 1976	Dec. 21, 1976
B 392,798	3,996,249	Mar. 30, 1976	Dec. 7, 1976
B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 395,554	3,998,156	Mar. 9, 1976	Dec. 21, 1976
B 395,975	4,001,085	Mar. 2, 1976	Jan. 4, 1977
B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 396,377	D 243,148	Apr. 6, 1976	Jan. 25, 1977
B 397,674	3,998,438	Mar. 16, 1976	Dec. 21, 1976
B 398,084	3,996,239	Feb. 3, 1976	Dec. 7, 1976
B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 399,098	3,997,665	Feb. 24, 1976	Dec. 14, 1976
B 399,632	4,001,046	Mar. 9, 1976	Jan. 4, 1977
B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 402,162	3,994,902	Mar. 2, 1976	Nov. 30, 1976
B 402,328	3,995,545	Apr. 6, 1976	Dec. 7, 1976
B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 403,243	3,996,232	Mar. 30, 1976	Dec. 7, 1976
B 403,326	4,001,212	Mar. 23, 1976	Jan. 4, 1977
B 403,477	3,995,315	Feb. 3, 1976	Nov. 30, 1976
B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 403,766	3,994,834	Feb. 10, 1976	Nov. 30, 1976
B 403,883	4,001,481	Mar. 23, 1976	Jan. 4, 1977
B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 406,546	D 242,966	Mar. 16, 1976	Jan. 11, 1977
B 407,205	4,000,966	Mar. 16, 1976	Jan. 4, 1977
B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 410,074	4,001,303	Feb. 24, 1976	Jan. 4, 1977
B 410,694	3,995,530	Mar. 23, 1976	Dec. 7, 1976
B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 411,624	4,001,205	Mar. 16, 1976	Jan. 4, 1977
B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 412,124	4,007,000	Mar. 23, 1976	Feb. 8, 1977
B 413,379	4,001,325	Mar. 9, 1976	Jan. 4, 1977
B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976
B 415,021	3,994,173	Mar. 2, 1976	Nov. 30, 1976
B 415,122	3,997,503	Feb. 10, 1976	Dec. 14, 1976
B 416,257	4,001,335	Mar. 16, 1976	Jan. 4, 1977
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976
B 417,164	4,001,360	Mar. 2, 1976	Jan. 4, 1977
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976
B 419,173	3,999,728	Mar. 9, 1976	Dec. 28, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976
B 420,176	4,001,017	Mar. 16, 1976	Jan. 4, 1977
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976
B 421,373	4,001,326	Mar. 23, 1976	Jan. 4, 1977
B 421,975	3,994,693	Mar. 2, 1976	Nov. 30, 1976
B 422,063	3,994,835	Feb. 3, 1976	Nov. 30, 1976
B 423,365	3,996,186	Feb. 17, 1976	Dec. 7, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976
B 423,441	3,997,137	Feb. 17, 1976	Dec. 14, 1976
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976
B 425,193	4,002,107	Mar. 23, 1976	Jan. 11, 1977
B 425,462	3,998,396	Mar. 9, 1976	Dec. 21, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976
B 426,227	3,999,028	Mar. 2, 1976	Dec. 21, 1976
B 426,266	3,998,839	Mar. 2, 1976	Dec. 21, 1976
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976
B 426,819	3,995,868	Feb. 17, 1976	Dec. 7, 1976

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DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976
B 427,946	4,006,161	Mar. 23, 1976	Feb. 1, 1977
B 428,103	4,000,211	Feb. 10, 1976	Dec. 28, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976
B 428,408	3,995,252	Mar. 2, 1976	Nov. 30, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976
B 429,027	4,001,260	Mar. 23, 1976	Jan. 4, 1977
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976
B 430,326	4,003,581	Mar. 23, 1976	Jan. 18, 1977
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 431,713	4,000,167	Feb. 10, 1976	Dec. 28, 1976
B 431,785	3,999,950	Feb. 24, 1976	Dec. 28, 1976
B 431,797	4,007,290	Mar. 30, 1976	Feb. 8, 1977
B 432,049	3,995,123	Mar. 23, 1976	Nov. 30, 1976
B 432,140	3,999,163	Mar. 23, 1976	Dec. 21, 1976
B 432,594	4,003,404	Mar. 30, 1976	Jan. 18, 1977
B 432,969	3,997,017	Mar. 2, 1976	Dec. 14, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 434,206	3,994,610	Feb. 3, 1976	Nov. 30, 1976
B 434,441	D 242,849	Mar. 16, 1976	Dec. 28, 1976
B 435,481	4,000,892	Mar. 9, 1976	Jan. 4, 1977
B 435,570	4,000,908	Mar. 16, 1976	Jan. 4, 1977
B 435,617	4,001,234	Mar. 16, 1976	Jan. 4, 1977
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976
B 437,209	4,001,193	Feb. 3, 1976	Jan. 4, 1977
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 437,894	4,001,015	Mar. 2, 1976	Jan. 4, 1977
B 438,048	4,001,394	Mar. 23, 1976	Jan. 4, 1977
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 439,778	4,001,455	Feb. 3, 1976	Jan. 4, 1977
B 440,548	4,001,271	Mar. 16, 1976	Jan. 4, 1977
B 440,633	4,000,116	Feb. 10, 1976	Dec. 28, 1976
B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 441,789	4,001,449	Mar. 30, 1976	Jan. 4, 1977
B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 442,295	4,000,477	Mar. 16, 1976	Dec. 28, 1976
B 442,810	3,997,533	Feb. 24, 1976	Dec. 14, 1976
B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 442,953	4,002,657	Mar. 23, 1976	Jan. 11, 1977
B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 443,563	3,996,204	Feb. 24, 1976	Dec. 7, 1976
B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 444,437	3,995,171	Mar. 9, 1976	Nov. 30, 1976
B 445,166	4,001,252	Mar. 2, 1976	Jan. 4, 1977
B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 445,493	3,994,903	Mar. 2, 1976	Nov. 30, 1976
B 445,690	3,999,584	Feb. 3, 1976	Dec. 28, 1976
B 446,107	4,001,276	Mar. 9, 1976	Jan. 4, 1977
B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 449,892	3,997,919	Mar. 23, 1976	Dec. 14, 1976
B 450,196	3,997,701	Feb. 10, 1976	Dec. 14, 1976
B 450,413	4,007,463	Mar. 23, 1976	Feb. 8, 1977
B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 450,870	3,998,951	Mar. 16, 1976	Dec. 21, 1976
B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 451,248	3,997,758	Mar. 2, 1976	Dec. 14, 1976
B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 451,396	4,000,450	Apr. 13, 1976	Dec. 28, 1976
B 451,438	Re. 29,066	Mar. 2, 1976	Dec. 7, 1976
B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 452,034	4,002,367	Mar. 23, 1976	Jan. 11, 1977
B 452,138	4,004,278	Mar. 23, 1976	Jan. 18, 1977
B 452,501	4,001,111	Mar. 16, 1976	Jan. 4, 1977
B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 452,879	4,001,089	Mar. 16, 1976	Jan. 4, 1977
B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 452,938	3,994,719	Feb. 17, 1976	Nov. 30, 1976
B 453,031	3,998,678	Mar. 16, 1976	Dec. 21, 1976
B 453,067	4,005,394	Mar. 23, 1976	Jan. 25, 1977
B 453,238	3,997,063	Mar. 2, 1976	Dec. 14, 1976
B 453,432	4,000,514	Mar. 16, 1976	Dec. 28, 1976
B 453,533	3,997,744	Feb. 17, 1976	Dec. 14, 1976
B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
B 453,759	3,989,790	Jan. 27, 1976	Nov. 2, 1976
B 454,283	3,995,153	Feb. 3, 1976	Nov. 30, 1976
B 455,425	3,990,060	Feb. 3, 1976	Nov. 2, 1976
B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
B 455,486	4,001,353	Mar. 16, 1976	Jan. 4, 1977
B 455,686	4,001,156	Mar. 2, 1976	Jan. 4, 1977
B 455,759	3,984,242	Feb. 24, 1976	Oct. 5, 1976
B 455,806	3,998,919	Mar. 23, 1976	Dec. 21, 1976
B 456,069	3,998,991	Mar. 9, 1976	Dec. 21, 1976
B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 456,153	3,997,992	Mar. 9, 1976	Dec. 21, 1976
B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 456,869	4,001,277	Mar. 9, 1976	Jan. 4, 1977
B 456,900	3,996,262	Feb. 3, 1976	Dec. 7, 1976
B 457,547	3,996,397	Feb. 17, 1976	Dec. 7, 1976
B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 457,931	4,001,229	Mar. 16, 1976	Jan. 4, 1977
B 458,500	3,997,805	Feb. 24, 1976	Dec. 14, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976
B 458,964	3,996,615	Mar. 2, 1976	Dec. 7, 1976
B 459,381	4,000,017	Mar. 9, 1976	Dec. 28, 1976
B 459,597	3,996,711	Feb. 17, 1976	Dec. 14, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 459,821	4,005,954	Mar. 30, 1976	Feb. 1, 1977
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976
B 461,250	4,000,768	Mar. 16, 1976	Jan. 4, 1977
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976
B 462,828	3,998,395	Mar. 9, 1976	Dec. 21, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976
B 463,473	4,002,068	Mar. 23, 1976	Jan. 11, 1977
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 464,027	3,999,390	Mar. 16, 1976	Dec. 28, 1976
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976
B 464,593	3,997,659	Mar. 9, 1976	Dec. 14, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976
B 465,955	3,997,502	Feb. 3, 1976	Dec. 14, 1976
B 466,304	4,007,095	Mar. 23, 1976	Feb. 8, 1977
B 466,318	3,999,115	Mar. 9, 1976	Dec. 21, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976
B 467,250	3,997,428	Feb. 3, 1976	Dec. 14, 1976
B 467,328	3,997,599	Mar. 9, 1976	Dec. 14, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976
B 468,100	3,995,107	Mar. 9, 1976	Nov. 30, 1976
B 468,330	4,001,475	Mar. 16, 1976	Jan. 4, 1977
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 468,603	4,003,839	Mar. 23, 1976	Jan. 18, 1977
B 469,036	4,005,926	Mar. 16, 1976	Feb. 1, 1977
B 469,468	4,000,220	Mar. 16, 1976	Dec. 28, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976
B 470,576	3,997,507	Feb. 24, 1976	Dec. 14, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976
B 470,853	4,002,101	Mar. 23, 1976	Jan. 11, 1977
B 470,899	3,996,441	Mar. 2, 1976	Dec. 7, 1976
B 470,900	4,001,213	Mar. 2, 1976	Jan. 4, 1977
B 471,116	4,001,318	Feb. 17, 1976	Jan. 4, 1977
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 471,617	3,994,871	Feb. 10, 1976	Nov. 30, 1976
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976
B 471,836	4,000,150	Feb. 24, 1976	Dec. 28, 1976
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976
B 472,760	4,001,330	Apr. 13, 1976	Jan. 4, 1977
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 474,747	3,997,704	Feb. 24, 1976	Dec. 14, 1976
B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 475,385	4,001,071	Mar. 9, 1976	Jan. 4, 1977
B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 476,267	4,005,068	Apr. 6, 1976	Jan. 25, 1977
B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 476,568	3,999,456	Mar. 16, 1976	Dec. 28, 1976
B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 476,776	3,998,715	Mar. 23, 1976	Dec. 21, 1976
B 476,967	3,995,206	Mar. 9, 1976	Nov. 30, 1976
B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 477,584	D 242,855	Apr. 6, 1976	Dec. 28, 1976
B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 479,502	3,999,030	Mar. 16, 1976	Dec. 21, 1976
B 479,681	D 242,672	Mar. 16, 1976	Dec. 14, 1976
B 479,969	4,001,132	Mar. 9, 1976	Jan. 4, 1977
B 480,114	4,001,327	Mar. 2, 1976	Jan. 4, 1977
B 480,287	4,006,029	Mar. 30, 1976	Feb. 1, 1977
B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 480,350	3,994,164	Feb. 10, 1976	Nov. 30, 1976
B 480,384	3,999,737	Mar. 23, 1976	Dec. 28, 1976
B 480,452	3,994,923	Feb. 10, 1976	Nov. 30, 1976
B 480,473	3,995,608	Mar. 2, 1976	Dec. 7, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,625	3,996,227	Feb. 24, 1976	Dec. 7, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 480,740	3,996,431	Mar. 2, 1976	Dec. 7, 1976
B 480,749	3,999,207	Mar. 9, 1976	Dec. 21, 1976
B 480,987	4,001,459	Mar. 30, 1976	Jan. 4, 1977
B 481,048	3,998,542	Mar. 16, 1976	Dec. 21, 1976
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 481,778	4,001,385	Mar. 30, 1976	Jan. 4, 1977
B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 481,989	4,008,337	Mar. 23, 1976	Feb. 15, 1977
B 482,058	4,001,398	Mar. 2, 1976	Jan. 4, 1977
B 482,660	3,995,026	Feb. 10, 1976	Nov. 30, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,247	4,001,889	Apr. 13, 1976	Jan. 4, 1977
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,268	3,995,215	Mar. 9, 1976	Nov. 30, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 484,068	3,994,937	Mar. 2, 1976	Nov. 30, 1976
B 484,121	3,997,770	Mar. 16, 1976	Dec. 14, 1976
B 484,269	4,000,159	Feb. 10, 1976	Dec. 28, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 484,419	4,001,292	Mar. 9, 1976	Jan. 4, 1977
B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 484,769	3,999,498	Mar. 16, 1976	Dec. 28, 1976
B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 485,188	4,001,170	Mar. 16, 1976	Jan. 4, 1977
B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 485,575	3,996,565	Feb. 24, 1976	Dec. 7, 1976
B 485,926	4,006,357	Mar. 23, 1976	Feb. 1, 1977
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 486,614	3,995,835	Feb. 17, 1976	Dec. 7, 1976
B 486,678	4,001,273	Mar. 2, 1976	Jan. 4, 1977
B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 487,423	3,998,810	Mar. 2, 1976	Dec. 21, 1976
B 487,427	3,995,788	Mar. 2, 1976	Dec. 7, 1976
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976
B 489,290	3,998,081	Feb. 17, 1976	Dec. 21, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 489,331	3,996,175	Feb. 17, 1976	Dec. 7, 1976
B 489,485	D 243,266	Apr. 13, 1976	Feb. 1, 1977
B 489,550	4,000,710	Mar. 16, 1976	Jan. 4, 1977
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,547	3,999,439	Feb. 24, 1976	Dec. 28, 1976
B 490,551	D 243,168	Apr. 6, 1976	Jan. 25, 1977
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976
B 490,623	3,996,964	Mar. 2, 1976	Dec. 14, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 490,812	3,998,842	Mar. 30, 1976	Dec. 21, 1976
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976
B 490,995	3,995,031	Feb. 3, 1976	Nov. 30, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,111	3,997,916	Feb. 17, 1976	Dec. 14, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,618	4,007,950	Mar. 16, 1976	Feb. 15, 1977
B 491,650	3,999,044	Mar. 9, 1976	Dec. 21, 1976
B 491,673	3,994,770	Feb. 17, 1976	Nov. 30, 1976
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976
B 492,039	3,997,541	Feb. 24, 1976	Dec. 14, 1976
B 492,093	4,003,658	Mar. 23, 1976	Jan. 18, 1977
B 492,120	3,995,692	Feb. 24, 1976	Dec. 7, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 492,716	3,998,739	Mar. 2, 1976	Dec. 21, 1976
B 492,774	4,001,843	Mar. 9, 1976	Jan. 4, 1977
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976
B 493,254	D 243,267	Apr. 13, 1976	Feb. 1, 1977
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 493,686	4,008,338	Mar. 23, 1976	Feb. 15, 1977
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,339	4,001,255	Mar. 16, 1976	Jan. 4, 1977
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976
B 495,185	3,999,166	Mar. 9, 1976	Dec. 21, 1976
B 495,331	4,000,456	Mar. 16, 1976	Dec. 28, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,408	4,000,222	Feb. 3, 1976	Dec. 28, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976
B 495,903	3,995,997	Feb. 17, 1976	Dec. 7, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,792	3,999,959	Feb. 17, 1976	Dec. 28, 1976
B 496,964	3,999,219	Apr. 20, 1976	Dec. 21, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 497,292	3,994,052	Feb. 3, 1976	Nov. 30, 1976
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 497,702	3,996,589	Mar. 2, 1976	Dec. 7, 1976
B 497,780	3,997,500	Feb. 24, 1976	Dec. 14, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 497,896	D 243,091	Apr. 6, 1976	Jan. 18, 1977
B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 498,208	4,001,480	Apr. 13, 1976	Jan. 4, 1977
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,820	3,996,670	Mar. 9, 1976	Dec. 14, 1976
B 498,951	3,996,907	Mar. 2, 1976	Dec. 14, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 499,209	3,995,907	Feb. 24, 1976	Dec. 7, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 499,324	4,001,375	Mar. 16, 1976	Jan. 4, 1977
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 499,786	4,000,663	Mar. 16, 1976	Jan. 4, 1977
B 500,171	3,997,262	Mar. 30, 1976	Dec. 14, 1976
B 500,176	3,995,316	Feb. 3, 1976	Nov. 30, 1976
B 500,408	D 242,721	Mar. 16, 1976	Dec. 14, 1976
B 500,945	3,996,817	Feb. 24, 1976	Dec. 14, 1976
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 501,503	4,001,640	Mar. 2, 1976	Jan. 4, 1977
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 501,975	3,998,466	Mar. 2, 1976	Dec. 21, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 502,151	3,998,614	Mar. 23, 1976	Dec. 21, 1976
B 502,161	4,000,500	Mar. 2, 1976	Dec. 28, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976
B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 503,345	4,001,235	Feb. 24, 1976	Jan. 4, 1977
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 503,456	4,007,702	Mar. 23, 1976	Feb. 15, 1977
B 503,521	3,999,646	Mar. 16, 1976	Dec. 28, 1976
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 503,618	3,997,782	Mar. 9, 1976	Dec. 14, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 504,156	3,999,048	Mar. 23, 1976	Dec. 21, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 504,404	3,996,499	Feb. 24, 1976	Dec. 7, 1976
B 504,405	4,007,401	Apr. 13, 1976	Feb. 8, 1977
B 504,439	3,999,398	Mar. 16, 1976	Dec. 28, 1976
B 504,503	3,999,210	Mar. 9, 1976	Dec. 21, 1976
B 504,582	4,005,138	Mar. 30, 1976	Jan. 25, 1977
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 504,877	3,997,564	Feb. 24, 1976	Dec. 14, 1976
B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 505,582	4,001,659	Mar. 23, 1976	Jan. 4, 1977
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976
B 506,624	3,999,695	Mar. 9, 1976	Dec. 28, 1976
B 506,648	3,994,857	Feb. 3, 1976	Nov. 30, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976
B 506,839	4,005,389	Mar. 23, 1976	Jan. 25, 1977
B 506,840	4,002,928	Mar. 23, 1976	Jan. 11, 1977
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976
B 507,131	4,000,499	Mar. 2, 1976	Dec. 28, 1976
B 507,396	3,995,167	Feb. 10, 1976	Nov. 30, 1976
B 507,476	3,994,680	Feb. 10, 1976	Nov. 30, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 508,639	4,004,194	Mar. 23, 1976	Jan. 18, 1977
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 508,878	3,994,117	Feb. 3, 1976	Nov. 30, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 509,043	3,996,767	Feb. 24, 1976	Dec. 14, 1976
B 509,165	3,999,155	Mar. 2, 1976	Dec. 21, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 509,474	3,997,260	Feb. 17, 1976	Dec. 14, 1976
B 509,586	4,006,645	Feb. 3, 1976	Feb. 8, 1977
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 509,772	3,999,004	Mar. 16, 1976	Dec. 21, 1976
B 510,184	D 242,784	Apr. 6, 1976	Dec. 21, 1976
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 510,458	4,000,221	Feb. 10, 1976	Dec. 28, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 510,682	4,000,978	Mar. 30, 1976	Jan. 4, 1977
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 511,907	3,999,622	Mar. 30, 1976	Dec. 28, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 511,002	3,998,717	Mar. 2, 1976	Dec. 21, 1976
B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976
B 511,665	4,001,037	Mar. 2, 1976	Jan. 4, 1977
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 512,818	3,997,363	Apr. 6, 1976	Dec. 14, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 512,964	3,995,279	Feb. 10, 1976	Nov. 30, 1976
B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 513,027	3,995,143	Feb. 17, 1976	Nov. 30, 1976
B 513,134	4,006,764	Mar. 23, 1976	Feb. 8, 1977
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 513,781	4,001,324	Feb. 24, 1976	Jan. 4, 1977
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 515,452	3,995,243	Feb. 10, 1976	Nov. 30, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 515,642	4,001,258	Feb. 24, 1976	Jan. 4, 1977
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 516,537	3,996,784	Feb. 17, 1976	Dec. 14, 1976
B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 516,609	3,994,486	Feb. 24, 1976	Nov. 30, 1976
B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 517,273	D 242,798	Mar. 16, 1976	Dec. 21, 1976
B 517,504	3,999,855	Mar. 9, 1976	Dec. 28, 1976
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 517,858	4,000,999	Feb. 17, 1976	Jan. 4, 1977
B 517,956	D 243,088	Apr. 6, 1976	Jan. 18, 1977
B 517,957	D 243,089	Apr. 6, 1976	Jan. 18, 1977
B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 518,326	4,008,282	Mar. 23, 1976	Feb. 15, 1977
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976
B 519,599	3,995,350	Feb. 17, 1976	Dec. 7, 1976
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 520,115	4,003,072	Mar. 23, 1976	Jan. 11, 1977
B 520,227	4,002,823	Mar. 30, 1976	Jan. 11, 1977
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 520,277	3,995,635	Feb. 17, 1976	Dec. 7, 1976
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 520,534	3,997,119	Feb. 17, 1976	Dec. 14, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 520,546	4,001,133	Mar. 2, 1976	Jan. 4, 1977
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 520,658	3,998,778	Mar. 9, 1976	Dec. 21, 1976
B 520,884	4,000,433	Mar. 16, 1976	Dec. 28, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 520,952	4,000,876	Mar. 16, 1976	Jan. 4, 1977
B 521,025	3,998,838	Mar. 23, 1976	Dec. 21, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 521,125	3,994,865	Feb. 10, 1976	Nov. 30, 1976
B 521,126	3,997,510	Feb. 10, 1976	Dec. 14, 1976
B 521,127	3,996,201	Feb. 17, 1976	Dec. 7, 1976
B 521,128	3,997,511	Feb. 10, 1976	Dec. 14, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 521,612	4,000,251	Mar. 9, 1976	Dec. 28, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 521,643	3,997,567	Mar. 2, 1976	Dec. 14, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 521,793	3,996,981	Feb. 24, 1976	Dec. 14, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 522,009	3,995,444	Feb. 17, 1976	Dec. 7, 1976
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976
B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976
B 522,446	4,001,194	Mar. 30, 1976	Jan. 4, 1977
B 522,537	3,999,587	Mar. 30, 1976	Dec. 28, 1976
B 522,567	3,996,238	Feb. 17, 1976	Dec. 7, 1976
B 522,568	D 242,785	Apr. 6, 1976	Dec. 21, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976
B 522,629	4,001,155	Mar. 16, 1976	Jan. 4, 1977
B 523,226	4,006,367	Mar. 23, 1976	Feb. 1, 1977
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976
B 524,806	4,000,065	Mar. 2, 1976	Dec. 28, 1976
B 525,133	3,996,481	Mar. 23, 1976	Dec. 7, 1976
B 525,204	4,001,109	Mar. 16, 1976	Jan. 4, 1977
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976
B 526,447	4,000,052	Feb. 24, 1976	Dec. 28, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976
B 527,171	3,998,248	Mar. 9, 1976	Dec. 21, 1976
B 527,187	3,995,202	Feb. 17, 1976	Nov. 30, 1976
B 527,333	3,999,732	Mar. 23, 1976	Dec. 28, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976
B 527,693	3,995,233	Feb. 3, 1976	Nov. 30, 1976
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976
B 527,972	4,000,016	Mar. 9, 1976	Dec. 28, 1976
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976
B 528,297	4,001,138	Mar. 16, 1976	Jan. 4, 1977
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976
B 529,194	4,000,776	Mar. 23, 1976	Jan. 4, 1977
B 529,659	3,996,875	Feb. 24, 1976	Dec. 14, 1976
B 529,836	3,994,345	Feb. 3, 1976	Nov. 30, 1976
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976
B 530,255	3,996,103	Mar. 2, 1976	Dec. 7, 1976
B 530,303	4,006,029	Mar. 23, 1976	Feb. 1, 1977
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976
B 530,569	3,999,865	Mar. 16, 1976	Dec. 28, 1976
B 530,580	4,001,151	Mar. 2, 1976	Jan. 4, 1977
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976
B 530,873	4,001,016	Feb. 17, 1976	Jan. 4, 1977
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976
D 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976
B 531,267	3,997,040	Feb. 24, 1976	Dec. 14, 1976
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976
B 531,566	3,997,820	Mar. 16, 1976	Dec. 14, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976
B 532,140	4,001,299	Mar. 2, 1976	Jan. 4, 1977
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976
B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976
B 532,976	4,000,837	Mar. 23, 1976	Jan. 4, 1977
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976
B 533,259	3,999,556	Feb. 24, 1976	Dec. 28, 1976
B 533,454	3,996,566	Mar. 2, 1976	Dec. 7, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 533,652	4,000,196	Mar. 23, 1976	Dec. 28, 1976
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 534,334	D 242,722	Mar. 16, 1976	Dec. 14, 1976
B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 534,574	3,995,624	Feb. 24, 1976	Dec. 7, 1976
B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 535,209	4,001,873	Mar. 16, 1976	Jan. 4, 1977
B 535,256	3,999,150	Mar. 23, 1976	Dec. 21, 1976
B 535,268	3,999,045	Mar. 30, 1976	Dec. 21, 1976
B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 535,437	3,997,555	Feb. 24, 1976	Dec. 14, 1976
B 535,448	3,997,123	Mar. 16, 1976	Dec. 14, 1976
B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 536,082	3,997,783	Mar. 16, 1976	Dec. 14, 1976
B 536,322	4,001,272	Mar. 23, 1976	Jan. 4, 1977
B 536,403	3,998,341	Mar. 23, 1976	Dec. 21, 1976
B 536,511	3,995,989	Mar. 9, 1976	Dec. 7, 1976
B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 536,923	4,007,828	Mar. 30, 1976	Feb. 15, 1977
B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 537,058	4,000,969	Mar. 23, 1976	Jan. 4, 1977
B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 539,374	3,996,229	Mar. 9, 1976	Dec. 7, 1976
B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 540,888	4,005,528	Mar. 30, 1976	Feb. 1, 1977
B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 541,464	3,995,424	Feb. 17, 1976	Dec. 7, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 541,501	4,005,826	Apr. 13, 1976	Feb. 1, 1977
B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 541,710	3,994,472	Feb. 24, 1976	Nov. 30, 1976
B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 543,078	3,995,687	Feb. 17, 1976	Dec. 7, 1976
B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 544,034	3,997,175	Feb. 17, 1976	Dec. 14, 1976
B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 544,899	3,994,962	Feb. 17, 1976	Nov. 30, 1976
B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 545,265	D 243,090	Apr. 13, 1976	Jan. 18, 1977
B 545,299	4,001,259	Feb. 24, 1976	Jan. 4, 1977
B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 545,777	4,004,906	Jan. 27, 1976	Jan. 25, 1977
B 545,856	4,006,939	Mar. 30, 1976	Feb. 8, 1977
B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 545,945	3,995,260	Jan. 27, 1976	Nov. 30, 1976
B 546,097	3,999,309	Mar. 23, 1976	Dec. 28, 1976
B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 547,016	3,999,741	Mar. 23, 1976	Dec. 28, 1976
B 547,208	4,001,218	Feb. 24, 1976	Jan. 4, 1977
B 547,547	3,997,670	Feb. 24, 1976	Dec. 14, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976
B 548,688	3,995,984	Mar. 9, 1976	Dec. 7, 1976
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976
B 548,978	3,998,139	Mar. 9, 1976	Dec. 21, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 549,964	3,995,899	Feb. 24, 1976	Dec. 7, 1976
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976
B 550,810	4,000,910	Mar. 23, 1976	Jan. 4, 1977
B 551,133	3,996,740	Mar. 2, 1976	Dec. 14, 1976
B 551,463	3,996,254	Feb. 17, 1976	Dec. 7, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 551,809	3,996,743	Feb. 24, 1976	Dec. 14, 1976
B 551,952	Re. 29,059	Mar. 2, 1976	Dec. 7, 1976
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976
B 552,489	3,994,864	Feb. 10, 1976	Nov. 30, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 552,508	4,001,250	Mar. 16, 1976	Jan. 4, 1977
B 552,629	3,994,773	Mar. 23, 1976	Nov. 30, 1976
B 552,709	4,001,467	Mar. 23, 1976	Jan. 4, 1977
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976
B 553,421	4,001,146	Mar. 23, 1976	Jan. 4, 1977
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976
B 553,629	3,999,242	Feb. 24, 1976	Dec. 28, 1976
B 554,039	3,999,944	Feb. 24, 1976	Dec. 28, 1976
B 554,164	4,001,465	Mar. 9, 1976	Jan. 4, 1977
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 554,291	4,001,209	Mar. 9, 1976	Jan. 4, 1977
B 554,380	4,001,147	Mar. 9, 1976	Jan. 4, 1977
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 554,848	4,001,265	Feb. 24, 1976	Jan. 4, 1977
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976
B 555,146	4,007,636	Apr. 20, 1976	Feb. 15, 1977
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 559,142	4,001,124	Mar. 2, 1976	Jan. 4, 1977
B 559,697	3,995,770	Mar. 16, 1976	Dec. 7, 1976
B 559,700	4,001,189	Mar. 23, 1976	Jan. 4, 1977
B 559,701	4,001,190	Mar. 23, 1976	Jan. 4, 1977
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976
B 561,365	4,005,078	Apr. 13, 1976	Jan. 25, 1977
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 561,405	4,003,770	Mar. 30, 1976	Jan. 18, 1977
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 561,770	4,000,366	Mar. 16, 1976	Dec. 28, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 562,413	4,000,930	Mar. 16, 1976	Jan. 4, 1977
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 562,601	3,998,360	Mar. 16, 1976	Dec. 21, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 563,070	3,996,230	Mar. 9, 1976	Dec. 7, 1976
B 563,165	4,000,977	Mar. 9, 1976	Jan. 4, 1977
B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 563,301	3,995,589	Feb. 17, 1976	Dec. 7, 1976
B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 563,419	3,999,051	Mar. 23, 1976	Dec. 21, 1976
B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 563,932	4,000,638	Mar. 23, 1976	Jan. 4, 1977
B 564,252	4,001,293	Mar. 2, 1976	Jan. 4, 1977
B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 564,902	4,001,351	Mar. 23, 1976	Jan. 4, 1977
B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 565,717	3,999,138	Apr. 13, 1976	Dec. 21, 1976
B 566,464	3,996,367	Feb. 3, 1976	Dec. 7, 1976
B 566,556	3,998,511	Mar. 23, 1976	Dec. 21, 1976
B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 566,585	4,001,083	Mar. 2, 1976	Jan. 4, 1977
B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 567,435	3,995,724	Feb. 3, 1976	Dec. 7, 1976
B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 567,892	4,000,855	Mar. 16, 1976	Jan. 4, 1977
B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 569,293	4,004,149	Mar. 30, 1976	Jan. 18, 1977
B 569,501	3,999,250	Mar. 9, 1976	Dec. 28, 1976
B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 569,859	3,994,160	Mar. 9, 1976	Nov. 30, 1976
B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 570,615	3,998,570	Mar. 23, 1976	Dec. 21, 1976
B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 571,638	4,001,244	Mar. 9, 1976	Jan. 4, 1977
B 571,659	3,995,186	Apr. 13, 1976	Nov. 30, 1976
B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 573,033	3,995,224	Mar. 23, 1976	Nov. 30, 1976
B 573,994	4,000,641	Mar. 23, 1976	Jan. 4, 1977
B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 574,616	4,000,424	Mar. 2, 1976	Dec. 28, 1976
B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 575,583	4,000,928	Mar. 16, 1976	Jan. 4, 1977
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 576,903	3,995,032	Feb. 3, 1976	Nov. 30, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 197
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 579,806	3,995,318	Feb. 3, 1976	Nov. 30, 1976
B 580,379	4,000,796	Apr. 6, 1976	Jan. 4, 1977
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976

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B 581,843	4,000,562	Mar. 16, 1976	Jan. 4, 1977	B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976	B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976	B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976
B 583,712	3,995,064	Feb. 10, 1976	Nov. 30, 1976	B 590,502	4,001,171	Mar. 23, 1976	Jan. 4, 1977
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976	B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976
B 584,997	4,000,030	Mar. 9, 1976	Dec. 28, 1976	B 592,146	4,001,084	Mar. 2, 1976	Jan. 4, 1977
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976	B 592,658	4,001,164	Mar. 23, 1976	Jan. 4, 1977
B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976	B 594,871	3,999,245	Mar. 16, 1976	Dec. 28, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976	B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976	B 597,410	4,000,925	Mar. 30, 1976	Jan. 4, 1977
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976	B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976	B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 587,118	Re. 29,067	Mar. 2, 1976	Dec. 7, 1976	B 750,679	4,007,049	Mar. 23, 1976	Feb. 8, 1977
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976	B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 587,936	3,999,052	Mar. 23, 1976	Dec. 21, 1976	B 845,044	4,001,338	Mar. 30, 1976	Jan. 4, 1977
B 589,179	4,001,102	Mar. 23, 1976	Jan. 4, 1977	B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976
B 589,687	3,995,349	Mar. 23, 1976	Dec. 7, 1976				

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PATENTS WERE ISSUED ON THE 15TH DAY OF FEBRUARY, 1977

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Dill, Frederick H.; and Konnerth, Karl L., Jr., to International Business Machines Corporation# System for performing spectral analyses under computer control. Re. 29,138, Cl. 235-151.320.

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Dill, Frederick H.; and Konnerth, Karl L., Jr., Re. 29,138.

Konnerth, Karl L., Jr.: *See—*
Dill, Frederick H.; and Konnerth, Karl L., Jr., Re. 29,138.

Lee, Chin K.; and Long, Margaret E., to R. J. Reynolds Tobacco Company. Enzymatic process using immobilized microbial cells. Re. 29,136, Cl. 195-116.000.

Long, Margaret E.: *See—*
Lee, Chin K.; and Long, Margaret E., Re. 29,136.

Mohwinkel, Franz, to Washington Nu Process, Inc. Process of preserving potatoes in closed packages. Re. 29,137, Cl. 426-412.000.

R. J. Reynolds Tobacco Company: *See—*
Lee, Chin K.; and Long, Margaret E., Re. 29,136.

Washington Nu Process, Inc.: *See—*
Mohwinkel, Franz, Re. 29,137.

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Abrams, Marilyn M. Invertible table unit. 243,371, 2-15-77, Cl. D6-3.000.

Allen, Howard Martin; and Barber, Ronald Charles, to Tektronix, Inc. Physiological sensor. 243,417, 2-15-77, Cl. D83-1.00F.

Almen, Rune G., to Sensotherm Aktiebolag. Heating panel element. 243,401, 2-15-77, Cl. D23-127.000.

American Optical Corporation: *See—*
Johnsen, David W., 243,395.
Johnsen, David W., 243,396.
Johnsen, David W., 243,397.
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Armorlite Inc.: *See—*
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Allen, Howard Martin; and Barber, Ronald Charles, 243,417.

Bauer, Richard A.: *See—*
Mooney, Thomas; Veselaski, Stephen; and Bauer, Richard A., 243,404.
Mooney, Thomas; and Bauer, Richard A., 243,406.
Mooney, Thomas; and Bauer, Richard A., 243,407.

Berger, Leon H. Cooking and utility pan. 243,380, 2-15-77, Cl. D7-85.000.

Brown, Linda C. Match holder. 243,410, 2-15-77, Cl. D27-32.000.

Cassia, Antonio Macchi, to Steiner American Corporation. Soap dispenser. 243,374, 2-15-77, Cl. D6-95.000.

de Jouennes, Roger. Carafe. 243,387, 2-15-77, Cl. D9-148.000.

Denny, Robert J.; and Horowitz, Richard D. Chair. 243,372, 2-15-77, Cl. D6-26.000.

DiOrio Enterprises, Inc.: *See—*
DiOrio, Russell A., 243,375.

DiOrio, Russell A., to DiOrio Enterprises, Inc. Jewelry display cabinet. 243,375, 2-15-77, Cl. D6-151.000.

Dumas, Sarah J. Container for newspapers or the like. 243,388, 2-15-77, Cl. D9-240.000.

Eckmann, John Allie; and Goldman, Arnold Sherwin, to Motorola, Inc. Radio pager apparatus or similar article. 243,409, 2-15-77, Cl. D14-70.000.

Fairthorne, Victor, to Land Ranger Manufacturing Inc. Car top carrier. 243,392, 2-15-77, Cl. D12-157.000.

Fidelitone, Inc.: *See—*
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Garsen, Marian E. Display stand. 243,373, 2-15-77, Cl. D6-85.000.

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Grieb, Joan, to General Electric Company. Wall plate. 243,385, 2-15-77, Cl. D8-351.000.

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Hedley, William, to Wilkinson Sword Limited. Razor handle. 243,419, 2-15-77, Cl. D28-48.000.

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Hoyt, Earl, to Morton-Norwich Products, Inc. Dispensing container. 243,386, 2-15-77, Cl. D9-71.000.

Hudson, Craig J.: *See—*
Mox, Dana W.; Smith, Charles M.; and Hudson, Craig J., 243,382.

Irving, Leonard A. Air freshener housing. 243,402, 2-15-77, Cl. D23-150.000.

ITE Imperial Corporation: *See—*
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Johnsen, David W., to American Optical Corporation. Pair of spectacles. 243,395, 2-15-77, Cl. D16-65.000.

Johnsen, David W., to American Optical Corporation. Pair of spectacles. 243,396, 2-15-77, Cl. D16-65.000.

Johnsen, David W., to American Optical Corporation. Spectacle frame front. 243,397, 2-15-77, Cl. D16-65.000.

Johnson, Betty Lee. Animal collar or similar article. 243,411, 2-15-77, Cl. D30-38.000.

Jones, Graham R., to Wilkinson Sword Limited. Combined razor blade and mount. 243,420, 2-15-77, Cl. D28-47.000.

K.K. Hamada Insatsuki Seizosho: *See—*
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Kridos, Thomas A. Spatula. 243,381, 2-15-77, Cl. D7-102.000.

Krueger, Kenneth K.; and Pavlov, Todor, to Shiley Laboratories, Inc. Pressure relief valve for a low pressure cuffed tracheostomy tube. 243,412, 2-15-77, Cl. D32-1.00R.

Land Ranger Manufacturing Inc.: *See—*
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Larson, William A., to Harbor Universal, Inc. Floor lamp. 243,415, 2-15-77, Cl. D48-20.00A.

Loughner, Larry G., to American Optical Corporation. Pair of spectacles. 243,398, 2-15-77, Cl. D16-65.000.

Lupton, William G. Combined filter, aerator and spray cooling unit for swimming pools. 243,399, 2-15-77, Cl. D23-4.000.

Lyon, John W. Plastic binding size selector. 243,389, 2-15-77, Cl. D10-64.000.

Mastrianni, Lena. Planter. 243,390, 2-15-77, Cl. D11-149.000.

McAllister, Jack G. Wind driven electric generator. 243,408, 2-15-77, Cl. D13-3.000.

Meeks, Emett O. Hot cup coaster and lid. 243,379, 2-15-77, Cl. D7-45.000.

Mooney, Thomas; Veselaski, Stephen; and Bauer, Richard A., to ITE Imperial Corporation. Ground clamp. 243,404, 2-15-77, Cl. D13-13.000.

Mooney, Thomas; and Veselaski, Stephen, to ITE Imperial Corporation. Saddle type connector. 243,405, 2-15-77, Cl. D13-13.000.

Mooney, Thomas; and Bauer, Richard A., to ITE Imperial Corporation. Threaded sealing ring for electrical connectors. 243,406, 2-15-77, Cl. D13-13.000.

Mooney, Thomas; and Bauer, Richard A., to ITE Imperial Corporation. Cradle type ground lug for conduit. 243,407, 2-15-77, Cl. D13-13.000.

Moore, Ronald M. Combined shelf and multiple cabinet unit. 243,377, 2-15-77, Cl. D6-186.000.

Morton-Norwich Products, Inc.: *See—*
Hoyt, Earl, 243,386.

Motorola, Inc.: *See—*
Eckmann, John Allie; and Goldman, Arnold Sherwin, 243,409.

Mox, Dana W.; Smith, Charles M.; and Hudson, Craig J., to Fidelitone, Inc. Record washer or similar article. 243,382, 2-15-77, Cl. D7-161.000.

Murata, Sadao: *See—*
Shimizu, Shigeru; Hatsuda, Kazuyuki; and Murata, Sadao, 243,416.

Nerad, Frank O.; and Robertson, Forbes C., to Armorlite Inc. Oval lenticular lens. 243,394, 2-15-77, Cl. D16-51.000.

Pavlov, Todor: *See—*
Krueger, Kenneth K.; and Pavlov, Todor, 243,412.

Ploszaj, Norman J. Bottle scraper. 243,383, 2-15-77, Cl. D7-181.000.
Presto Lock Company, Division of Walter Kidde & Company, Inc.: *See*—
Stolarz, Edward M., 243,384.
Rellis, Lawrence Bernard. Electrical outlet adapter. 243,403, 2-15-77, Cl. D13-29.000.
Riley, Martin O. Water filler fitting. 243,400, 2-15-77, Cl. D23-40.000.
Robertson, Forbes C.: *See*—
Nerad, Frank O.; and Robertson, Forbes C., 243,394.
Rowe Furniture Corporation: *See*—
Scott, Rupert A., 243,376.
Savage, Woody. Horse race game indicator. 243,413, 2-15-77, Cl. D34-5.0MM.
Schmidt, Harald, to Hansa Plastics, Inc. Tire valve extender. 243,391, 2-15-77, Cl. D12-153.000.
Scott, Rupert A., to Rowe Furniture Corporation. Table. 243,376, 2-15-77, Cl. D6-175.000.
Sensotherm Aktiebolag: *See*—
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Shimizu, Shigeru; Hatsuda, Kazuyuki; and Murata, Sadao, to K.K. Hamada Insatsuki Seizosho. Offset printing press machine. 243,416, 2-15-77, Cl. D64-11.00R.
Smith, Charles M.: *See*—
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Stolarz, Edward M., to Presto Lock Company, Division of Walter Kidde & Company, Inc. Combined draw bolt and lock for luggage or the like. 243,384, 2-15-77, Cl. D8-338.000.
Tektronix, Inc.: *See*—
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Tharp, Gary Lee. Picture frame. 243,378, 2-15-77, Cl. D6-242.000.
Veselaski, Stephen: *See*—
Mooney, Thomas; Veselaski, Stephen; and Bauer, Richard A., 243,404.
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Vyskocil, Ralph G. Game turntable for segregating and identifying by category poker chips. 243,414, 2-15-77, Cl. D34-13.00A.
Wilkinson Sword Limited: *See*—
Hedley, William, 243,419.
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Wolff, Martin J., to Sperry Rand Corporation. Hand held electric hair dryer. 243,418, 2-15-77, Cl. D28-13.000.
Wynn, Freddie L. Truck bed removably mountable utility storage carryall. 243,393, 2-15-77, Cl. D12-157.000.

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11	4,007,584

CLASS 60

201	4,007,586
204	4,007,587
274	4,007,588
276	4,007,589
284	4,007,590
325	4,007,591
391	4,007,592
548	4,007,593
618	4,007,594
644	4,007,595
652	4,007,596
707	4,007,597

CLASS 61

90	4,007,598
104	4,007,599

CLASS 62

3	4,007,600
100	4,007,601
137	4,007,602
151	4,007,603
174	4,007,604
184	4,007,605
475	4,007,606

CLASS 65

4 A	4,008,061
158	4,008,062
305	4,008,063

CLASS 66

9 B	4,007,607
40	4,007,608
116	4,007,609
117	4,007,610
132 T	4,007,585
195	4,007,611

CLASS 68

23.2	4,007,612

CLASS 70

58	4,007,613
234	4,007,614
387	4,007,615

CLASS 71

28	4,008,064
34	4,008,065
76	4,008,066
88	4,008,067
90	4,008,068
	4,008,069
92	4,008,070
99	4,008,071

CLASS 72

38	4,007,616
234	4,007,617
245	4,007,618
272	4,007,619
345	4,007,620
351	4,007,621
393	4,007,622

CLASS 73

12	4,007,623
23	4,007,624
	4,007,625
23.1	4,007,626
32 A	4,007,627
40.5 R	4,007,628
53	4,007,629
71.4	4,007,630
	4,007,631
78	4,007,632
84	4,007,633
114	4,007,634
273	4,007,635
290 R	4,007,636
343.5	4,007,637
421 A	4,007,638
425.4 P	4,007,639
425.4 R	4,007,640
425.6	4,007,641
462	4,007,642

CLASS 74

2	4,007,643
229	4,007,644
501 R	4,007,645
	4,007,646
	4,007,647
763	4,007,648
803	4,007,649

CLASS 75

1 R	4,008,072
.5 R	4,008,073
43	4,008,074
77	4,008,075
101 R	4,008,076
118 P	4,008,077
124	4,008,078
134 N	4,008,080
134 T	4,008,079
135	4,008,081

CLASS 81

64	4,007,650
180 R	4,007,651

CLASS 83

106	4,007,652
140	4,007,653
155	4,007,654
	4,007,655
175	4,007,656
471.3	4,007,657

CLASS 84

312	4,007,658

CLASS 85

70	4,007,659

CLASS 89

1.807	4,007,660

CLASS 90

5	4,007,661

CLASS 91

6.5	4,007,662
	4,007,663
49	4,007,664
391 R	4,007,665
446	4,007,666

CLASS 92

60	4,007,667

CLASS 93

1 C	4,007,668
8 R	4,007,669
36.01	4,007,670
58 ST	4,007,671

CLASS 96

1.5	4,008,082
27 R	4,008,083
35	4,008,084
48 R	4,008,085
56.5	4,008,086
69	4,008,087
84 R	4,008,088
108	4,008,089

CLASS 98

37	4,007,672
40 V	4,007,673

CLASS 99

281	4,007,674
286	4,007,675
545	4,007,676

CLASS 100

45	4,007,677
52	4,007,678
53	4,007,679

CLASS 101

153	4,007,680
288	4,007,681
348	4,007,682
363	4,007,683
366	4,007,684

CLASS 102

39	4,007,685
44	4,007,686
45	4,007,687
49.5	4,007,688
78	4,007,689
87	4,007,690
90	4,007,691

CLASS 104

134	4,007,692

CLASS 105

144	4,007,693

CLASS 106

43	4,008,090
48	4,008,091
59	4,008,092
89	4,008,093
99	4,008,094
235	4,008,095
277	4,008,096
288 Q	4,008,097

CLASS 108

55.1	4,007,694

CLASS 110

13	4,007,695
31	4,007,696
45	4,007,697

CLASS 112

80	4,007,698

CLASS 113

118 C	4,007,699

CLASS 114

74 T	4,007,700
222	4,007,701
230	4,007,702

CLASS 116

142 FP	4,007,703

CLASS 118

6	4,007,704
7	4,007,705
50	4,007,706
647	4,007,707

CLASS 119

1	4,007,708
2	4,007,709
14.03	4,007,710
51.5	4,007,711

CLASS 122

250 R	4,007,712
504	4,007,713

CLASS 123

8.09	4,007,714
8.43	4,007,715
90.28	4,007,716
103 R	4,007,717
119 D	4,007,718
	4,007,719
122 R	4,007,720
134	4,007,721
139 AW	4,007,722
148 CC	4,007,724
148 R	4,007,723
190 A	4,007,725

CLASS 126

67	4,007,726
200	4,007,727
271	4,007,728
	4,007,729
286	4,007,730

CLASS 127

19	4,008,098

CLASS 128

2 B	4,007,732
2 S	4,007,733
2 Z	4,007,731
2.05 G	4,007,734
37	4,007,735
145.8	4,007,736
188	4,007,737
214 D	4,007,738
218 R	4,007,739
221	4,007,740
230	4,007,742
292	4,007,741
334 R	4,007,743

CLASS 130

27 Q	4,007,744

CLASS 131

261 R	4,007,745
267	4,007,746

CLASS 132

7	4,007,747
73	4,007,748

CLASS 134

56 R	4,007,749
83	4,007,750
140	4,007,751

CLASS 135

25 R	4,007,752
	4,007,753

CLASS 137

2	4,007,754
101.21	4,007,755
115	4,007,756
315	4,007,757
472	4,007,758
550	4,007,759
614.13	4,007,760

CLASS 138

103	4,007,761

CLASS 139

54	4,007,762
116	4,007,763

CLASS 141

35	4,007,764
59	4,007,765
98	4,007,766

CLASS 144

328	4,007,767

CLASS 145

50 D	4,007,768

CLASS 148

6.11	4,008,102
6.15 R	4,008,101
12 F	4,008,103
13.1	4,008,104
101	4,008,105
172	4,008,106
175	4,008,107

CLASS 149

2	4,008,108
37	4,008,109
46	4,008,110

CLASS 152

330 RF	4,007,769

CLASS 156

52	4,008,113
267	4,008,115
328	4,008,116
380	4,008,117
392	4,008,114
499	4,008,118
541	4,008,119
644	4,008,112
656	4,008,111

CLASS 162

89	4,008,120
124	4,008,121
290	4,008,122
336	4,008,123

CLASS 164

52	4,007,770
56	4,007,771
151	4,007,772

CLASS 165

1	4,007,773
	4,007,774
	4,007,775
18	4,007,776
32	4,007,777
34	4,007,778
	4,007,779
39	4,007,780
46	4,007,781

CLASS 166

79	4,007,782
135	4,007,783

170	4,007,784
263	4,007,785
266	4,007,786
267	4,007,787
272	4,007,788
281	4,007,789
299	4,007,790
300	4,007,791
308	4,007,792

CLASS 169

25	4,007,793

CLASS 171

1	4,007,794

CLASS 173

50	4,007,795

CLASS 174

68 B	4,008,365
88 B	4,008,366
107	4,008,367
120 R	4,008,368

CLASS 175

4.55	4,007,796
26	4,007,797
297	4,007,798
340	4,007,799

CLASS 177

209	4,007,800

CLASS 178

67	4,008,373

CLASS 179

1 CN	4,008,376
1 E	4,008,374
1 VC	4,008,375
7 R	4,008,377
15 A	4,008,378
90 B	4,008,380
90 K	4,008,379
100.4 ST	4,008,381

CLASS 180

74	4,007,801
82 C	4,007,802

CLASS 181

117	4,007,803
118	4,007,804
120	4,007,805
131	4,007,806

CLASS 182

109	4,007,807
142	4,007,808

CLASS 186

1 AC	4,007,809
1 R	4,007,810

CLASS 187

29 R	4,007,811
	4,007,812

CLASS 188

76	4,007,813
218 XL	4,007,814
265	4,007,815
290	4,007,816

CLASS 191

10	4,007,817

CLASS 192

56 R	4,007,818
58 B	4,007,819
67 R	4,007,820

CLASS 193

4	4,007,821
35 R	4,007,822

CLASS 195

31 F	4,008,124
51 R	4,008,125
63	4,008,126
65	4,008,127
116	Re.29,136

CLASS 196

110	4,008,128

CLASS 197

181	4,007,823

CLASS 198

462	4,007,824
770	4,007,825
813	4,007,826
862	4,007,827

CLASS 200

51 R	4,008,382
648 D	4,008,287

CLASS 202

268	4,008,129

CLASS 203

6	4,008,130
82	4,008,131

CLASS 204

79	4,008,132
80	4,008,133
108	4,008,134
149	4,008,135
158 HE	4,008,137
158 R	4,008,136
159.14	4,008,138
162 R	4,008,139
181	4,008,140
195 G	4,008,141
225	4,008,142
257	4,008,143
290 R	4,008,144

CLASS 206

1.5	4,007,828
108	4,007,829
175	4,007,830
219	4,007,831
306	4,007,832
321	4,007,833
338	4,007,834
411	4,007,835
422	4,007,836
448	4,007,837
484	4,007,838
503	4,007,839

CLASS 208

8	4,008,145
11 LE	4,008,146
126	4,008,147
211	4,008,148
216	4,008,149
352	4,008,150

CLASS 209

9	4,008,151
80.5	4,007,840
444	4,008,152

CLASS 210

7	4,008,159
23 R	4,008,160
30 R	4,008,161
45	4,008,162
208	4,008,153
217	4,008,154
242 R	4,008,155
	4,008,156
321 B	4,008,157
386	4,008,158

CLASS 211

59.1	4,007,841

CLASS 214

16 R	4,007,842
16.4 B	4,007,843
75 T	4,007,844
138 D	4,007,845
152	4,007,846
670	4,007,847

CLASS 215

31	4,007,848
213	4,007,849
216	4,007,850
307	4,007,851

CLASS 219

10.55 D	4,008,383
125 R	4,008,384
269	4,008,385

CLASS 220

3.2	4,007,852

CLASS 221

3	4,007,853
167	4,007,854

CLASS 222

26	4,007,855
67	4,007,856
153	4,007,857
193	4,007,858
443	4,007,859

CLASS 223

46	4,007,860
85	4,007,861

CLASS 224

42.1 B	4,007,862
42.24	4,007,863
42.46 R	4,007,864

CLASS 226

17	4,007,865
31	4,007,866

CLASS 228

179	4,007,867

CLASS 229

20	4,007,868
41 B	4,007,869

CLASS 232

34	4,007,870

CLASS 233

27	4,007,871

CLASS 235

150.1	4,008,386
151.1	4,008,387
151.32	Re.29,138
151.35	4,008,388
153 AS	4,008,389

CLASS 236

15 A	4,007,872
49	4,007,873

CLASS 237

2 B	4,007,874
12.3 A	4,007,875

CLASS 239

10	4,007,876
209	4,007,877
	4,007,878
214	4,007,879
585	4,007,880

CLASS 242

4 B	4,007,881
18 R	4,007,882
35.5 R	4,007,883
41	4,007,884
43 R	4,007,885
84.2 R	4,007,886
86.5 R	4,007,887
118.6	4,007,888
199	4,007,889

CLASS 244

42 D	4,007,896
50	4,007,890
53 B	4,007,891
62	4,007,892
64	4,007,893
104 FP	4,007,894
138 R	4,007,895

CLASS 246

187 B	4,007,897

CLASS 248

26	4,007,898
49	4,007,899
311.1	4,007,900
526	4,007,901
534	4,007,902

CLASS 249

145	4,007,903

CLASS 250

199	4,008,390
208	4,008,391
270	4,008,392
328	4,008,393
345	4,008,394
352	4,008,395
358 T	4,008,396
372	4,008,398
373	4,008,397
390	4,008,399
445 T	4,008,400
453	4,008,401
492 A	4,008,402

CLASS 251

1 B	4,007,904
1 R	4,007,905
26	4,007,906
83	4,007,907
127	4,007,908
149.2	4,007,909
229	4,007,910
233	4,007,911
355	4,007,912

CLASS 252

1	4,008,163
8.55 B	4,008,164
8.55 D	4,008,165
89 B	4,008,166
99	4,008,167
182	4,008,168
191	4,008,169
194	4,008,170
301.1 W	4,008,171
301.21	4,008,172
358	4,008,173
411 S	4,008,174
426	4,008,175
429 B	4,008,176
	4,008,177
434	4,008,178
437	4,008,179
439	4,008,180
465	4,008,181
466 PT	4,008,182
512	4,008,183
522	4,008,184

CLASS 254

18	4,007,913
108	4,007,914
	4,007,915
132	4,007,916

CLASS 256

13.1	4,007,917
59	4,007,918
	4,007,919

CLASS 259

108	4,007,920
151	4,007,921
191	4,007,922

CLASS 260

2.5 AC	4,008,185
2.5 AD	4,008,189
2.5 AJ	4,008,187
2.5 AP	4,008,188
2.5 FP	4,008,186
5	4,008,190
17 R	4,008,191
17.3	4,008,214
18 TN	4,008,192
23 XA	4,008,193
28 R	4,008,194
29.2 N	4,008,195
29.2 TN	4,008,196
31.6	4,008,197
37 SB	4,008,198
40 R	4,008,199
45.75 N	4,008,200
45.75 S	4,008,201
47 UA	4,008,202
49	4,008,203
	4,008,204
	4,008,205
75 M	4,008,206
75 R	4,008,207
79.3 R	4,008,208
112.5 LH	4,008,209
123.5	4,008,210
147	4,008,211
157	4,008,212
160	4,008,213
183	4,008,215
186	4,008,216
192	4,008,217
239 BB	4,008,219
239.1	4,008,220
	4,008,221
239.3 B	4,008,223
239.3 T	4,008,222
240 CA	4,008,224
240 G	4,008,225
243 C	4,008,226
	4,008,227
	4,008,228
	4,008,229
	4,008,230
	4,008,231
247.1 M	4,008,232
247.2 B	4,008,233
249.6	4,008,234
256.4 N	4,008,235
	4,008,236
287 AN	4,008,237
289 AZ	4,008,238
290 P	4,008,239
293.58	4,008,240
295.5 A	4,008,241
305	4,008,242
306.7 R	4,008,244
306.7 T	4,008,243
	4,008,245
306.8 R	4,008,246
308 A	4,008,248
308 B	4,008,247
310 R	4,008,249
326.27	4,008,250
333	4,008,251
340.5	4,008,252
340.7	4,008,253
346.2 M	4,008,254
346.4	4,008,255
347.4	4,008,256
397.1	4,008,257
410	4,008,258
438.1	4,008,259
439 R	4,008,260
448.2 E	4,008,261
465 E	4,008,262
468 D	4,008,263
470	4,008,264
473 G	4,008,265
475 R	4,008,266
509	4,008,267
514 H	4,008,268
515 A	4,008,269
515 R	4,008,270
545 R	4,008,271
552 R	4,008,272
554	4,008,273
359 S	4,008,274
570 D	4,008,275
570.5 P	4,008,276
571	4,008,277
578	4,008,278
601 R	4,008,279
604 R	4,008,280
606.5 P	4,008,281
	4,008,282
615 A	4,008,283
619 D	4,008,284
635 C	4,008,285
635 H	4,008,286
666 P	4,008,288
671 R	4,008,289
672 T	4,008,290
683.43	4,008,291
683.45	4,008,292
856	4,008,293
862	4,008,294
876 R	4,008,295
940	4,008,296

CLASS 261

39 B	4,008,297
44 R	4,008,298

CLASS 264

63	4,008,299
104	4,008,300
137	4,008,301
156	4,008,302
210 F	4,008,303
236	4,008,304
336	4,008,305

CLASS 266

217	4,007,923

CLASS 267

57.1 R	4,007,924

CLASS 271

160	4,007,925

CLASS 272

37	4,007,926
73	4,007,927

CLASS 273

32 B	4,007,928
73 R	4,007,929
74	4,007,930
84	4,007,931
85 F	4,007,932
86 C	4,007,933
101.2	4,007,934
108	4,007,935
115	4,007,936
134 CA	4,007,937
177 R	4,007,938

CLASS 274

23 A	4,007,939

CLASS 277

32	4,007,940
178	4,007,941

CLASS 279

3	4,007,942
121	4,007,943

CLASS 280

154.5 R	4,007,944
478 B	4,007,945
600	4,007,946
642	4,007,947
744	4,007,948
767	4,007,949

CLASS 281

25 R	4,007,950

CLASS 285

137 R	4,007,951
	4,007,952
321	4,007,953

CLASS 292

165	4,007,954
216	4,007,955
347	4,007,956

CLASS 294

82 R	4,007,957

CLASS 296

28 C	4,007,958

CLASS 297

42	4,007,959
71	4,007,960
111	4,007,961
306	4,007,962

CLASS 299

2	4,007,963
4	4,007,964
11	4,007,965
	4,007,966

CLASS 301

37 P	4,007,967
38 R	4,007,968

CLASS 302

25	4,007,969

CLASS 303

93	4,007,970
109	4,007,971

CLASS 305

11	4,007,972

CLASS 307

113	4,008,403
149	4,008,404
231	4,008,405
304	4,008,406

CLASS 308

9	4,007,973
	4,007,974
238	4,007,975

CLASS 310

4 R	4,008,407
9.1	4,008,408
45	4,008,409
237	4,008,410

CLASS 313

61 R	4,008,411
309	4,008,412
331	4,008,413

CLASS 315

97	4,008,414
156	4,008,415
194	4,008,416

CLASS 318

138	4,008,422
139	4,008,423
171	4,008,421
293	4,008,424
314	4,008,425
331	4,008,426

CLASS 321

18	4,008,427
69 R	4,008,428

CLASS 323

17	4,008,429

CLASS 324

15	4,008,430
16 S	4,008,434
16 T	4,008,431
43 R	4,008,432
61 P	4,008,433

CLASS 325

38 B	4,008,435
335	4,008,436
422	4,008,437
446	4,008,438

CLASS 328

163	4,008,439
171	4,008,440

CLASS 330

35	4,008,441
	4,008,442

CLASS 331

38	4,008,443
94.5 D	4,008,445
94.5 S	4,008,444
96	4,008,446

CLASS 335

128	4,008,447
258	4,008,448
273	4,008,449

CLASS 336

132	4,008,450

CLASS 337

161	4,008,451

284 4,008,452
345 4,008,453
386 4,008,454

CLASS 339

14 RP 4,007,976
217 S 4,007,977

CLASS 340

1 R 4,008,455
6 R 4,008,456
15.5 CP 4,008,459
146.3 SY 4,008,457
151 4,008,458
172.5 4,008,460
4,008,461
4,008,462
174 TF 4,008,463
239 R 4,008,464
274 C 4,008,465
282 4,008,466
310 A 4,008,467
347 AD 4,008,468

CLASS 343

5 NA 4,008,469
6 A 4,008,470
6.5 LC 4,008,471
7 A 4,008,472
7.5 4,008,473
7.7 4,008,474
14 4,008,475
17.7 4,008,476
701 4,008,477
720 4,008,478
895 4,008,479

CLASS 350

96 WG 4,007,978
156 4,007,979

CLASS 351

6 4,007,980

CLASS 354

5 4,008,480
27 4,008,481
104 4,008,482
277 4,008,483

CLASS 355

4 4,007,981
15 4,007,982
4,007,983
16 4,007,984
46 4,007,985
57 4,007,986
91 4,007,987
133 4,007,988

CLASS 356

96 4,007,989
124 4,007,990
141 4,007,991
160 4,007,992

CLASS 357

17 4,008,485
36 4,008,484
74 4,008,486
81 4,008,487

CLASS 358

84 4,008,369
155 4,008,370
206 4,008,371
227 4,008,372

CLASS 360

51 4,008,488
85 4,008,489
94 4,008,490
97 4,008,491
98 4,008,492
124 4,008,493

CLASS 361

18 4,008,418
53 4,008,417
153 4,008,420
334 4,008,419

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